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April 3, 2017

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Minnesota Pollution Control Agency
Remediation Division
520 Lafayette Avenue North
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Subject: FY17 1st Quarter – Quarterly Sampling Event; MacGillis & Gibbs Superfund Site; AECOM Project 60436248; MPCA Work Order 3000016591

Ms. Jamie Wallerstedt,

This groundwater monitoring report provides a summary of the quarterly groundwater monitoring event performed by AECOM Technical Services (AECOM) in August 2016 at the MacGillis & Gibbs site in New Brighton, MN (Figure 1). This work was performed by AECOM for the Minnesota Pollution Control Agency (MPCA) under MPCA Work Order 3000016591.

Groundwater monitoring is being conducted to evaluate contaminant trends over time relative to the chemicals of concern (COCs) as a result of operations associated with the former MacGillis & Gibbs facility. Moreover, the change in contaminant concentration over time assists in determining how the aquifer is responding to the shutdown of off-site extraction wells EW-1, EW-3B, EW-5, EW-12, EW-15, EW-16, and EW-18 in December 2014. This groundwater monitoring event is the first of four quarterly events for this Work Order for FY17 (Third Quarter, 2016).

Groundwater samples were submitted to a State Contract Laboratory for analysis of pentachlorophenol (PCP), arsenic, hexavalent chromium and dioxins—all of which have been historically present in the contaminant plume. Each groundwater sample was collected in accordance with MPCA Guidance. Additionally, groundwater elevations were measured to evaluate any changes to the groundwater flow due to the December 2014 shutdown of the non-sources area extraction wells.

Procedures

Sampling of both monitoring and extraction wells followed these procedures:

- New nitrile gloves were used at each well to minimize the potential for cross contamination
- Water level measurements were taken to the closest 0.01 foot from the top of inner most casing of the each well to the top of the water table prior to sampling
- New tubing was used at each well
- Static water was purged from the well prior to sampling using a low flow device.
    - The field parameters (pH, specific conductance, temperature, dissolved oxygen) were measured when purging each well,
    - Groundwater samples were collected once field parameters stabilized or after the equivalent of three well volumes of groundwater were removed; whichever occurred first
- Samples for arsenic and hexavalent chromium analysis were field filtered using a 0.45 micron in-line filter.
    - Arsenic samples were preserved with nitric acid,
    - Hexavalent chromium was delivered to the lab for analysis within 24 hours of collection

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- Arsenic, PCP and dioxins were delivered to the lab within 48 hours of collection
- Any submerged pumping equipment was either decontaminated with Alconox and distilled water or replaced prior to sampling additional wells,
- The MPCA Lab Checklist was completed for all analytical results (Appendix 2).

Results

A summary of the FY 17 1st Quarter analytical results are shown in Table 1. Detailed results for the dioxin analyses are provided in Table 2. To provide further reference, analytical results from December 2013-August 2016 are presented in Table 3. Current and historical groundwater elevations are shown in Table 4.

Recommendations

The next monitoring event will be conducted in the fall of 2016.

Attachments

Figure 1. FY 2017 Quarter 1 Quarterly MacGillis and Gibbs Well Sample Locations

Table 1. FY 2017 Quarter 1 Groundwater Contaminant Concentrations
Table 2 FY 2017 Quarter 1 Groundwater Dioxin Concentrations
Table 3. Groundwater Contaminant Concentrations 2013 to Summer 2016
Table 4. Historical Groundwater Elevations

Appendix 1. Laboratory Analytical Results
Appendix 2. MPCA Lab Checklist

Please contact Drew Tarara or Tony Coryell at 612-376-2000 with questions or comments in regards to this report or other project business.

Respectfully,

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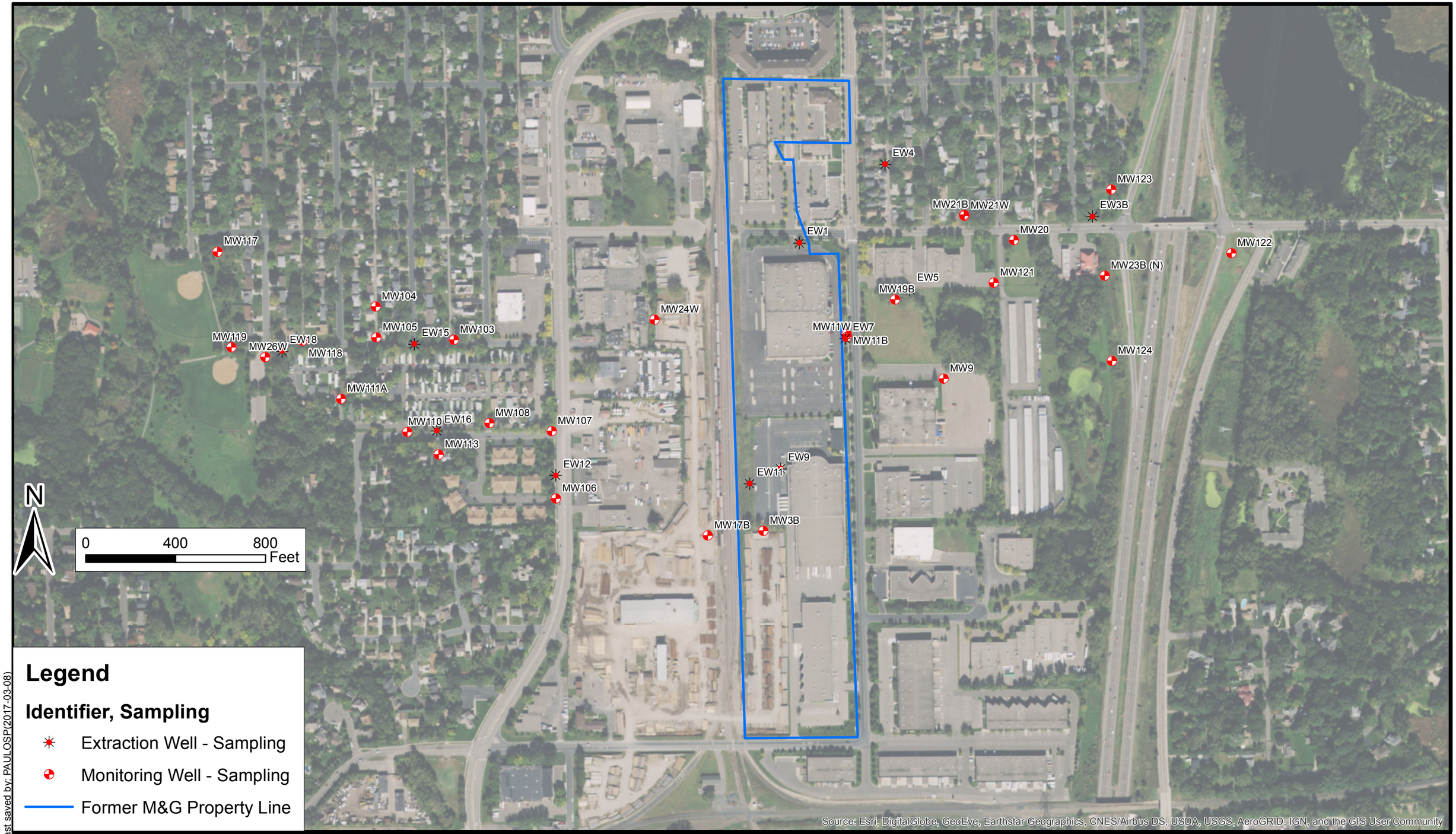
cc:



Filename: P:\Water_Env\MPCA\FY17_MPCA\FY17 Projects\60436248 MacGillis&Gibbs O&M FY17\900_WorkingDocs-CAD\2017\PDFs\Figure 2 - Sampling Location Map.mxd
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MacGillis and Gibbs
Quarterly Monitoring Memo
New Brighton, MN
Project No.: 60436248 Date: 3/8/2017

Quarterly Sampling Location Map

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Figure 1

Table 1
FY 2017 First Quarter Groundwater Contaminant Concentrations
MacGillis and Gibbs

			Pentachlorophenol Total ug/L	Arsenic Dissolved ug/L	Chromium(VI) Dissolved ug/L	Total 2,3,7,8-TCDD Equivalence[a] pg/L
		Cleanup Goal:	**1**	**5**	**100**	**12**
Well Name	**Unique Well ID**	**Date Sampled**				
EW-1	592308	08/17/16	< 0.61	2.1	**168**	--
EW-3B	683305	08/18/16	< 0.62	**7.9**	< 0.50	--
EW-3B FD	683305	08/18/16	< 0.62	**7.8**	< 0.50	--
EW-4	616507	08/18/16	**3.2 J**	0.60	8.9	--
EW-5	623329	08/17/16	< 0.62	1.3	< 0.50	--
EW-7	616483	08/17/16	< 0.62 J	--	26.1	--
EW-9	616485	08/17/16	**31800**	--	--	--
EW-11	623340	08/17/16	**--**	--	--	0.27
EW-12	628999	08/18/16	**5.8 J**	0.30 J	0.32 J	--
EW-15	628907	08/18/16	< 0.64	0.53	0.91	--
EW-16	628911	08/18/16	< 0.62	0.98	0.12 J	--
EW-18	683303	08/18/16	< 0.62	0.82	< 0.50	--
MW-3B	478240	08/17/16	**307**	--	--	--
MW-3W	478217	08/17/16	**--**	--	--	**110**
MW-9	478245	08/17/16	< 0.63 J	--	3.6	--
MW-11B	478230	08/17/16	**5880**	1.1	0.025 J	11
MW-11W	478222	08/17/16	--	--	**314**	--
MW-17B	515061	08/17/16	**728**	--	--	1.2
MW-17B FD	515061	08/17/16	**707**	--	--	--
MW-19B	522741	08/17/16	**35.8**	0.74	1.2	--
MW-20	522739	08/17/16	**36.6**	1.2	**450 J**	--
MW-20 FD	522739	08/17/16	**29.6**	1.1	**599 J**	--
MW-21B	522735	08/17/16	**7.5 J**	0.51	10.8	--
MW-21W	522734	08/17/16	**3.5 J**	0.39 J	< 0.50	--
MW-23B	598356	08/19/16	< 0.62	--	--	--
MW-24W	592323	08/18/16	**76.3 J**	--	--	--
MW-26W	592301	08/18/16	< 0.62 J	--	--	--
MW-103	619704	08/19/16	< 0.62 J	--	--	--
MW-104	619705	08/18/16	<1.3 J	--	--	--
MW-105	619709	08/18/16	**11.7 J**	--	--	--
MW-105 FD	619709	08/18/16	**18.4**	--	--	--
MW-106	619712	08/19/16	< 0.62	--	--	--
MW-107	619713	08/19/16	**4.2**	--	--	--
MW-108	619714	08/19/16	< 0.62	--	--	--
MW-110	619715	08/16/16	< 0.64	--	--	--

Table 1
FY 2017 First Quarter Groundwater Contaminant Concentrations
MacGillis and Gibbs

			Pentachlorophenol Total ug/L	Arsenic Dissolved ug/L	Chromium(VI) Dissolved ug/L	Total 2,3,7,8-TCDD Equivalence[a] pg/L
		Cleanup Goal:	**1**	**5**	**100**	**12**
Well Name	**Unique Well ID**	**Date Sampled**				
MW-111A	684901	08/16/16	< 0.65	--	--	--
MW-113	619719	08/16/16	< 0.67	--	--	--
MW-117	619725	08/18/16	< 0.63	--	--	--
MW-118	619726	08/19/16	**34.8**	--	--	--
MW-119	619727	08/18/16	< 0.64	--	--	--
MW-121	619729	08/18/16	< 0.63	0.49 J	--	--
MW-122	658172	08/16/16	< 0.67	--	--	--
MW-123	619730	08/16/16	< 0.67	**6.3**	--	--
MW-124	658173	08/19/16	< 0.63	--	--	--

Notes:

<XX - Less than the laboratory reporting limit

BOLD = Concentration exceeds the site clean up goal

- = Not analyzed for this parameter

[a] - Calculated using 2005 WHO Factors

B1 - Associated with laboratory method blank contamination

J = Estimated concentration

Well IDs:

"W" used in the suffix indicates the well screen in in a shallower zone

"B" is assigned to wells where the screen is near the base or near-bottom of the New Brighton aquifer

Table 2
FY 2017 First Quarter Groundwater Dioxin Concentrations
MacGillis and Gibbs

		Well Name	EW-11	MW-11B	MW-17B	MW-3W
		Unique Well ID	623340	478230	515061	478217
		Sample Date	8/17/2016	8/17/2016	8/17/2016	8/17/2016
Analyte	**Units**					
Total 2,3,7,8-TCDD Equivalence[a]	pg/L		0.27	11	1.2	**110**
2,3,7,8-Tetrachlorodibenzofuran	pg/L		< 0.61	< 1.1	< 0.52	2.6 J
2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/L		< 0.6	< 0.58	< 0.56	1 J
1,2,3,7,8-Pentachlorodibenzofuran	pg/L		< 0.39	1 J	< 0.53	6.2 J
2,3,4,7,8-Pentachlorodibenzofuran	pg/L		< 0.2	1.1 J	< 0.29	18 J
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/L		< 0.18	0.78 J	< 0.28	5.4 J
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L		0.72 J	2.2 J	0.83 J	120
1,2,3,6,7,8-Hexachlorodibenzofuran	pg/L		< 0.25	1.8 J	0.66 J	15 J
2,3,4,6,7,8-Hexachlorodibenzofuran	pg/L		< 0.19	2.9 J	0.74 J	24 J
1,2,3,7,8,9-Hexachlorodibenzofuran	pg/L		< 0.35	1 J	< 0.29	15 J
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/L		< 0.28	0.74 J	0.34 J	23 J
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/L		0.38 J	11 J	1.6 J	110
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/L		< 0.24	5.4 J	0.51 J	30 J
1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/L		1.5 J	57	23 J	1300
1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/L		< 0.39	2.5 J	1.2 J	74
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/L		11 J	550	32 J	3800
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	pg/L		3.6 J	62 J	100 J	5400
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	pg/L		110	4000	320	36000

Notes:

<XX - Less than the laboratory estimated detection limit

B - Less than 10x the method blank level

J - Estimated value

[a] - Calculated using 2005 WHO Factors

Well IDs:

"W" used in the suffix indicates the well screen in in a shallower zone

"B" is assigned to wells where the screen is near the base or near-bottom of the New Brighton aquifer

Table 3
Groundwater Concentrations 2013 to August 2016
MacGillis and Gibbs

			Pentachlorophenol Total ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L
		Cleanup Goal:	**1**	**5**	**5**	**100**	**100**	**100**	**100**
Well Name	**Unique Well ID**	**Date Sampled**							
EW-1	592308	04/25/13	< 22.5	1.6	--	**147**	--	--	--
EW-1	592308	12/10/13	--	1.5	--	**145**	--	--	--
EW-1	592308	08/17/16	< 0.61	2.1	--	--	--	**168**	--
EW-3B	683305	12/10/13	**197**	0.69	--	3.7	--	--	--
EW-3B	683305	09/29/14	**227**	--	1.1	--	3.9	--	--
EW-3B	683305	05/28/15	0.24 J	1.8	**16.5**	3.4	7.8	--	--
EW-3B	683305	11/20/15	< 0.33	**14.1**	**12.5**	--	--	--	9.9 J
EW-3B	683305	05/24/16	< 0.62	**5.7**	--	--	--	< 10	--
EW-3B	683305	08/18/16	< 0.62	**7.9**	--	--	--	< 0.50	--
EW-3B FD	683305	08/18/16	< 0.62	**7.8**	--	--	--	< 0.50	--
EW-4	616507	12/09/13	0.38 J	--	--	--	--	--	--
EW-4	616507	08/14/14	< 0.32	--	0.54	--	5.6	--	--
EW-4	616507	08/18/16	**3.2 J**	0.60	--	--	--	8.9	--
EW-5	623329	04/25/13	< 21.5	0.70	--	1.9	--	--	--
EW-5	623329	05/28/15	**2.1**	0.98	2.9	0.18	4.2	--	--
EW-5	623329	11/20/15	0.23 J	0.89	1.2	--	--	--	< 10
EW-5	623329	05/24/16	< 0.64 J	0.91	--	--	--	5.1	--
EW-5	623329	08/17/16	< 0.62	1.3	--	--	--	< 0.50	--
EW-7	616483	12/09/13	< 22.0	--	1.6	--	28.3	--	--
EW-7	616483	08/13/14	0.52	--	--	--	--	--	--
EW-7	616483	05/29/15	**935**	--	--	--	--	--	--
EW-7 FD	616483	05/29/15	**812**	--	--	--	--	--	--
EW-7	616483	11/19/15	**5.1**	--	--	--	--	--	--
EW-7	616483	05/24/16	0.61 J	1.3	--	--	--	34	--
EW-7	616483	08/17/16	< 0.62 J	--	--	--	--	26.1	--

Table 3
Groundwater Concentrations 2013 to August 2016
MacGillis and Gibbs

			Pentachlorophenol Total ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L
		Cleanup Goal:	**1**	**5**	**5**	**100**	**100**	**100**	**100**
Well Name	**Unique Well ID**	**Date Sampled**							
EW-9	616485	01/10/14	**102000**	--	--	--	--	--	--
EW-9	616485	08/13/14	**19800**	--	--	--	--	--	--
EW-9	616485	08/17/16	**31800**	--	--	--	--	--	--
EW-11	623340	12/09/13	**2700**	--	--	--	--	--	--
EW-11	623340	08/13/14	**1900**	--	--	--	--	--	--
EW-12	628999	09/29/14	< 21.1	--	0.69	--	**1610**	--	--
EW-12	628999	05/29/15	**5.4**	0.39 J	0.36 J	1.2	1.3	--	--
EW-12	628999	11/20/15	**1.1**	0.50 J	0.41 J	--	--	--	< 10
EW-12	628999	05/24/16	**5.8**	0.34 J	--	--	--	< 10	--
EW-12	628999	08/18/16	**5.8 J**	0.30 J	--	--	--	0.32 J	--
EW-15	628907	09/29/14	**22.4 J**	--	**7.5**	--	53.3	--	--
EW-15	628907	05/29/15	0.21 J	0.87	2.2	1.8	56.1	--	--
EW-15	628907	11/20/15	< 0.33	0.85	4.3	--	--	--	< 10
EW-15	628907	05/24/16	< 0.62	0.68	--	--	--	< 10	--
EW-15	628907	08/18/16	< 0.64	0.53	--	--	--	0.91	--
EW-16	628911	09/29/14	**23.2**	--	0.91	--	0.95	--	--
EW-16	628911	05/29/15	0.25 J	1.4	1.3	0.29 J	1.2	--	--
EW-16	628911	11/20/15	< 0.33	1.5	1.5	--	--	--	< 10
EW-16	628911	05/25/16	< 0.66	0.96	--	--	--	--	--
EW-16	628911	08/18/16	< 0.62	0.98	--	--	--	0.12 J	--
EW-18	683303	09/29/14	**25.4**	--	1.2	--	0.32 J	--	--
EW-18	683303	05/29/15	0.21	0.94	1.1	0.75	12.4	--	--
EW-18	683303	11/20/15	< 0.32	0.90	**7.1**	--	--	--	< 10
EW-18	683303	05/24/16	0.58 J	0.79	--	--	--	< 10	--
EW-18	683303	08/18/16	< 0.62	0.82	--	--	--	< 0.50	--
MW-3B	478240	12/18/13	**102**	--	--	--	--	--	--
MW-3B FD	478240	12/18/13	**128**	--	--	--	--	--	--
MW-3B	478240	08/14/14	**687**	--	--	--	--	--	--
MW-3B	478240	08/17/16	**307**	--	--	--	--	--	--
MW-9	478245	12/19/13	0.33 J	--	0.20 J	--	4.1	--	--
MW-9	478245	08/12/14	0.20 J	--	0.25 J	--	48.9	--	--
MW-9	478245	08/17/16	< 0.63 J	--	--	--	--	3.6	--

			Pentachlorophenol Total ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L
		Cleanup Goal:	**1**	**5**	**5**	**100**	**100**	**100**	**100**
Well Name	**Unique Well ID**	**Date Sampled**							
MW-11B	478230	04/25/13	**2070**	3.3	--	0.93	--	--	--
MW-11B FD	478230	04/25/13	**3420**	3.4	--	0.53	--	--	--
MW-11B	478230	12/16/13	**8640**	--	2.3	--	0.23 J	--	--
MW-11B	478230	08/13/14	--	--	1.6	--	13.8	--	--
MW-11B	478230	05/24/16	**2220**	0.54	--	--	--	< 10	--
MW-11B	478230	08/17/16	**5880**	1.1	--	--	--	0.025 J	--
MW-11W	478222	04/25/13	< 23.3	0.73	--	**196**	--	--	--
MW-11W	478222	12/16/13	0.31 J	--	0.70	--	**120**	--	--
MW-11W	478222	08/13/14	--	--	0.82	--	**247**	--	--
MW-11W	478222	08/17/16	--	--	--	--	--	**314**	--
MW-17B	515061	08/11/14	**222**	--	--	--	--	--	--
MW-17B	515061	08/17/16	**728**	--	--	--	--	--	--
MW-17B FD	515061	08/17/16	**707**	--	--	--	--	--	--
MW-19B	522741	12/19/13	**236**	--	0.97	--	0.87	--	--
MW-19B	522741	08/12/14	**78.8**	1.1	--	59.1	--	--	--
MW-19B	522741	05/27/15	**272**	1.1	1.1	1.5	14.3	--	--
MW-19B	522741	11/19/15	**188**	0.96	0.87	--	--	--	< 10
MW-19B	522741	05/24/16	**111**	0.74	--	--	--	< 10	--
MW-19B FD	522741	05/24/16	**85.4**	0.73	--	--	--	< 10	--
MW-19B	522741	08/17/16	**35.8**	0.74	--	--	--	1.2	--
MW-20	522739	04/25/13	< 20.5	1.2	--	**1290**	--	--	--
MW-20	522739	12/19/13	**7.3**	1.0	--	**545**	--	--	--
MW-20	522739	08/13/14	**48.0**	1.1	--	**234**	--	--	--
MW-20	522739	05/28/15	**464**	1.0	1.1	77.2	84.1	--	--
MW-20	522739	11/19/15	**322**	1.0	0.86	93.9	75.9	--	79
MW-20 FD	522739	11/19/15	**241**	1.0	0.83	--	--	--	87
MW-20	522739	05/24/16	**293**	0.89	--	--	--	62	--
MW-20	522739	08/17/16	**36.6**	1.2	--	--	--	**450 J**	--
MW-20 FD	522739	08/17/16	**29.6**	1.1	--	--	--	**599 J**	--

Table 3
Groundwater Concentrations 2013 to August 2016
MacGillis and Gibbs

			Pentachlorophenol Total ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L
		Cleanup Goal:	**1**	**5**	**5**	**100**	**100**	**100**	**100**
Well Name	**Unique Well ID**	**Date Sampled**							
MW-21B	522735	12/20/13	**34.3**	0.47 J	--	39.4	--	--	--
MW-21B	522735	08/14/14	**6.1**	--	0.57	--	16.9	--	--
MW-21B	522735	05/24/16	0.95	0.44 J	--	--	--	4.9	--
MW-21B	522735	08/17/16	**7.5 J**	0.51	--	--	--	10.8	--
MW-21W	522734	12/20/13	**26.4**	0.42 J	--	0.35 J	--	--	--
MW-21W	522734	08/14/14	**13.0**	--	0.44 J	--	0.56	--	--
MW-21W	522734	11/19/15	**10.7**	0.39 J	0.30 J	--	--	--	< 10
MW-21W	522734	05/24/16	**13.9**	--	--	--	--	--	--
MW-21W	522734	08/17/16	**3.5 J**	0.39 J	--	--	--	< 0.50	--
MW-23B	598356	08/14/14	**38.4**	--	0.55	--	1.2	--	--
MW-23B	598356	05/25/16	< 0.66	--	--	--	--	--	--
MW-23B	598356	08/19/16	< 0.62	--	--	--	--	--	--
MW-24W	592323	05/29/15	**16.3**	--	--	--	--	--	--
MW-24W	592323	11/17/15	0.60	--	--	--	--	--	--
MW-24W	592323	08/18/16	**76.3 J**	--	--	--	--	--	--
MW-26W	592301	12/18/13	0.32 J	--	--	--	--	--	--
MW-26W	592301	08/14/14	0.18 J	--	--	--	--	--	--
MW-26W	592301	05/28/15	< 0.32	--	--	--	--	--	--
MW-26W	592301	11/18/15	< 0.30	--	--	--	--	--	--
MW-26W	592301	05/23/16	< 0.64 J	--	--	--	--	--	--
MW-26W	592301	08/18/16	< 0.62 J	--	--	--	--	--	--
MW-103	619704	12/31/13	**1.2**	--	--	--	--	--	--
MW-103	619704	08/13/14	**1.5**	--	--	--	--	--	--
MW-103	619704	05/29/15	0.22 J	--	--	--	--	--	--
MW-103	619704	11/18/15	< 0.31	--	--	--	--	--	--
MW-103	619704	05/23/16	**2.2 B1**	--	--	--	--	--	--
MW-103	619704	08/19/16	< 0.62 J	--	--	--	--	--	--

Table 3
Groundwater Concentrations 2013 to August 2016
MacGillis and Gibbs

			Pentachlorophenol Total ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L
		Cleanup Goal:	**1**	**5**	**5**	**100**	**100**	**100**	**100**
Well Name	**Unique Well ID**	**Date Sampled**							
MW-104	619705	12/30/13	**57.1**	--	--	--	--	--	--
MW-104	619705	08/13/14	**38.5**	--	--	--	--	--	--
MW-104	619705	05/28/15	**16.6**	--	--	--	--	--	--
MW-104	619705	11/18/15	**42.6**	--	--	--	--	--	--
MW-104	619705	05/23/16	0.69 B1	--	--	--	--	--	--
MW-104	619705	08/18/16	<1.3 J	--	--	--	--	--	--
MW-105	619709	12/30/13	**43.8**	--	--	--	--	--	--
MW-105	619709	08/13/14	**40.0**	--	--	--	--	--	--
MW-105	619709	05/28/15	**156**	--	--	--	--	--	--
MW-105	619709	11/19/15	**85.9**	--	--	--	--	--	--
MW-105	619709	05/23/16	**36.4**	--	--	--	--	--	--
MW-105 FD	619709	05/23/16	**48.6**	--	--	--	--	--	--
MW-105	619709	08/18/16	**11.7 J**	--	--	--	--	--	--
MW-105 FD	619709	08/18/16	**18.4**	--	--	--	--	--	--
MW-106	619712	01/02/14	**7.3**	--	--	--	--	--	--
MW-106	619712	08/13/14	**3.4**	--	--	--	--	--	--
MW-106	619712	05/23/16	0.41 J	--	--	--	--	--	--
MW-106	619712	08/19/16	< 0.62	--	--	--	--	--	--
MW-107	619713	12/10/13	**8.3**	--	--	--	--	--	--
MW-107	619713	08/13/14	**5.3**	--	--	--	--	--	--
MW-107	619713	05/28/15	**4.9**	--	--	--	--	--	--
MW-107	619713	11/18/15	**1.8**	--	--	--	--	--	--
MW-107	619713	05/23/16	< 0.61 J	--	--	--	--	--	--
MW-107	619713	08/19/16	**4.2**	--	--	--	--	--	--
MW-108	619714	12/20/13	**34.3**	--	--	--	--	--	--
MW-108	619714	05/28/15	**24.7**	--	--	--	--	--	--
MW-108	619714	08/13/14	0.92	--	--	--	--	--	--
MW-108	619714	11/17/15	**11.3**	--	--	--	--	--	--
MW-108	619714	05/23/16	**6.9 J**	--	--	--	--	--	--
MW-108 FD	619714	05/23/16	**2.2 J**	--	--	--	--	--	--
MW-108	619714	08/19/16	< 0.62	--	--	--	--	--	--

Table 3
Groundwater Concentrations 2013 to August 2016
MacGillis and Gibbs

			Pentachlorophenol Total ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L
		Cleanup Goal:	**1**	**5**	**5**	**100**	**100**	**100**	**100**
Well Name	**Unique Well ID**	**Date Sampled**							
MW-110	619715	01/03/14	0.31 J	--	--	--	--	--	--
MW-110	619715	08/12/14	**3.9**	--	--	--	--	--	--
MW-110	619715	05/28/15	0.38	--	--	--	--	--	--
MW-110	619715	11/19/15	< 0.31	--	--	--	--	--	--
MW-110	619715	05/25/16	< 0.67	--	--	--	--	--	--
MW-110	619715	08/16/16	< 0.64	--	--	--	--	--	--
MW-111A	684901	12/31/13	0.30 J	--	--	--	--	--	--
MW-111A	684901	08/12/14	< 0.34	--	--	--	--	--	--
MW-111A	684901	05/29/15	< 0.32	--	--	--	--	--	--
MW-111A	684901	11/17/15	< 0.31	--	--	--	--	--	--
MW-111A	684901	05/25/16	< 0.68	--	--	--	--	--	--
MW-111A	684901	08/16/16	< 0.65	--	--	--	--	--	--
MW-113	619719	01/02/14	**7.1 J**	--	--	--	--	--	--
MW-113	619719	08/13/14	**4.2**	--	--	--	--	--	--
MW-113	619719	05/28/15	**2.0**	--	--	--	--	--	--
MW-113	619719	11/19/15	**4.1**	--	--	--	--	--	--
MW-113	619719	05/25/16	**2.7**	--	--	--	--	--	--
MW-113	619719	08/16/16	< 0.67	--	--	--	--	--	--
MW-117	619725	12/20/13	0.32 J	--	--	--	--	--	--
MW-117 FD	619725	12/20/13	0.32 J	--	--	--	--	--	--
MW-117	619725	08/14/14	0.16 J	--	--	--	--	--	--
MW-117	619725	05/27/15	0.21 J	--	--	--	--	--	--
MW-117	619725	11/17/15	< 0.31	--	--	--	--	--	--
MW-117	619725	05/23/16	0.84 JB1	--	--	--	--	--	--
MW-117	619725	08/18/16	< 0.63	--	--	--	--	--	--
MW-118	619726	12/30/13	**46.4**	--	--	--	--	--	--
MW-118	619726	08/13/14	**19.3**	--	--	--	--	--	--
MW-118	619726	05/28/15	**26.5**	--	--	--	--	--	--
MW-118	619726	11/18/15	**22.3**	--	--	--	--	--	--
MW-118 FD	619726	11/18/15	**19.0**	--	--	--	--	--	--
MW-118	619726	05/23/16	**23.4 J**	--	--	--	--	--	--
MW-118	619726	08/19/16	**34.8**	--	--	--	--	--	--

Table 3
Groundwater Concentrations 2013 to August 2016
MacGillis and Gibbs

			Pentachlorophenol Total ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L
		Cleanup Goal:	**1**	**5**	**5**	**100**	**100**	**100**	**100**
Well Name	**Unique Well ID**	**Date Sampled**							
MW-119	619727	12/18/13	0.32 J	--	--	--	--	--	--
MW-119	619727	08/14/14	< 0.32	--	--	--	--	--	--
MW-119	619727	05/23/16	< 0.63 J	--	--	--	--	--	--
MW-119	619727	08/18/16	< 0.64	--	--	--	--	--	--
MW-121	619729	12/23/13	--	1.9	--	0.092 J	--	--	--
MW-121	619729	12/31/13	0.32 J	--	--	--	--	--	--
MW-121	619729	08/12/14	< 0.32	--	--	--	--	--	--
MW-121	619729	05/25/16	< 0.67	0.44 J	--	--	--	--	--
MW-121	619729	08/18/16	< 0.63	0.49 J	--	--	--	--	--
MW-122	658172	05/03/13	< 22.0	1.7	--	< 0.50	--	--	--
MW-122	658172	01/03/14	< 0.51	--	--	--	--	--	--
MW-122	658172	05/29/15	< 0.30	--	--	--	--	--	--
MW-122	658172	11/17/15	< 0.31	--	--	--	--	--	--
MW-122	658172	05/24/16	< 0.62	--	--	--	--	--	--
MW-122	658172	08/16/16	< 0.67	--	--	--	--	--	--
MW-123	619730	01/03/14	0.32 J	--	--	--	--	--	--
MW-123	619730	05/29/15	< 0.32	--	--	--	--	--	--
MW-123	619730	11/20/15	< 0.31	**6.3**	**5.6**	--	--	--	< 10
MW-123	619730	05/25/16	< 0.67 J	**6.5**	--	--	--	--	--
MW-123	619730	08/16/16	< 0.67	**6.3**	--	--	--	--	--
MW-124	658173	04/25/13	< 20.6	2.1	--	< 0.50	--	--	--
MW-124	658173	08/19/16	< 0.63	--	--	--	--	--	--

Notes:

<XX - Less than the laboratory reporting limit

BOLD = Concentration exceeds the site clean up goal

- = Not analyzed for this parameter

B1 - Associated with laboratory method blank contamination

J = Estimated concentration

Well IDs:

"W" used in the suffix indicates the well screen in in a shallower zone

"B" is assigned to wells where the screen is near the base or near-bottom of the New Brighton aquifer

Table 4
Historical Ground Water Elevation

Well Name	Unique Well ID	Dec-12	Jun-12	Apr-13	May-13	Dec-13	Aug-14	May-15	Nov-15	May-16	Aug-16
EW-1	592308	NA	889.54	893.19	887.13	NA	NA	NA	NA	NA	894.98
EW-3B	683305	NA	869.06	887.99	880.83	NA	NA	888.29	888.81	886.56	886.92
EW-4	616507	NA	892.56	NA	NA	NA	895.08	NA	NA	NA	892.47
EW-5	623329	NA	884.62	893.6	893.62	NA	NA	894.6	895.15	894.96	893.76
EW-7	616483	NA	889.44	893.7	885.45	NA	NA	887.25	NA	NA	NA
EW-9	616485	NA	882.61	893.96	NA	NA	NA	NA	NA	NA	NA
EW-10	616486	NA	880.26	895.07	885.03	NA	NA	NA	NA	NA	NA
EW-11	623340	NA	872.26	894.1	874.13	NA	NA	NA	NA	NA	NA
EW-12	628999	893.56	NA	NA	NA	NA	NA	895.76	896.8	896.94	897.56
EW-13	616512	882.54	NA	894.34	883.05	NA	NA	NA	NA	NA	NA
EW-15	628907	892.18	NA	891.56	891.64	NA	NA	893	894.1	893.94	893.97
EW-16	628911	893.2	NA	893.15	893.22	NA	NA	893.82	895.14	896.07	895.91
EW-18	683303	861.47	NA	NA	NA	NA	NA	878.55	879.44	878.94	879.34
MW-1B	478224	NA	893.61	892.65	892.81	NA	895.41	NA	NA	NA	NA
MW-1W	478215	NA	894.46	893.79	893.87	NA	897.09	NA	NA	NA	NA
MW-1H	478233	NA	842.1	842.78	843.03	NA	NA	NA	NA	NA	NA
MW-2B	478225	NA	895.13	894.98	895.15	NA	898.25	NA	NA	NA	NA
MW-2W	478216	NA	895.82	895.66	896.04	NA	900.05	NA	NA	NA	NA
MW-3B	478240	NA	894.07	895.3	894.53	NA	897.58	NA	NA	NA	897.75
MW-3W	478217	NA	895.54	895.41	895.75	NA	NA	NA	NA	NA	897.83
MW-3H	478239	NA	840.09	840.88	841.11	NA	NA	NA	NA	NA	NA
MW-7B	478243	NA	895.71	NA	NA	NA	893.67	NA	NA	NA	NA
MW-7W	478242	NA	895.66	NA	NA	NA	898.01	NA	NA	NA	NA
MW-9	478245	NA	895.93	895.54	895.76	NA	896.9	NA	NA	NA	896.73
MW-11B	478230	NA	892.81	892.46	892.5	NA	894.88	NA	NA	894.51	893.51
MW-11H	478235	NA	838.42	838.89	839.29	NA	NA	NA	NA	NA	NA
MW-11W	478222	NA	893.06	892.74	892.74	NA	894.93	NA	NA	NA	894.55
MW-14W	478250	NA	892.68	NA	NA	NA	NA	NA	NA	NA	NA

Table 4
Historical Ground Water Elevation

Well Name	Unique Well ID	Dec-12	Jun-12	Apr-13	May-13	Dec-13	Aug-14	May-15	Nov-15	May-16	Aug-16
MW-14B	476390	NA	892.54	NA	NA	NA	NA	NA	NA	NA	NA
MW-15B	476389	NA	894.83	893.9	894.21	NA	NA	NA	NA	NA	NA
MW-15H	476387	NA	838.4	838.6	839.52	NA	NA	NA	NA	NA	NA
MW-15W	476388	NA	896.33	895.83	896.28	NA	NA	NA	NA	NA	NA
MW-16H	478234	NA	838.86	839.18	839.74	NA	NA	NA	NA	NA	NA
MW-16B	478232	NA	893.79	893.16	893.3	NA	895.76	NA	NA	NA	NA
MW-17B	515061	NA	895.2	NA	NA	NA	898.13	NA	NA	NA	898.12
MW-17W	515060	NA	895.23	NA	NA	NA	898.12	NA	NA	NA	NA
MW-18B	522737	NA	894.23	NA	894.38	NA	897.57	NA	NA	NA	NA
MW-18W	522736	NA	894.38	NA	894.51	NA	897.77	NA	NA	NA	NA
MW-19B	522741	NA	893.64	893.69	893.93	NA	895.33	893.47	896.56	895.44	894.55
MW-19W	522740	NA	893.77	893.82	894.03	NA	895.16	NA	NA	NA	NA
MW-20	522739	NA	889.18	889.83	889.68	NA	889.73	889.96	890.51	890.31	888.21
MW-21B	522735	NA	890.04	890.27	890.29	NA	890.86	NA	NA	891.13	888.78
MW-21W	522734	NA	888.74	889.94	889.56	NA	888.88	889.6	891.76	889.57	887.67
MW-21B	522735	NA	890.04	890.27	890.29	NA	NA	NA	NA	NA	NA
MW-22	522733	NA	891.05	NA	NA	NA	892.71	NA	NA	NA	NA
MW-23B	598356	NA	886.3	887.74	887.43	NA	886.55	NA	NA	888.05	886.88
MW-23W	598357	NA	886.49	887.66	887.9	NA	886.21	NA	NA	NA	NA
MW-24B	592324	NA	896.82	NA	NA	NA	897.97	NA	NA	NA	NA
MW-24W	592323	NA	897.28	NA	NA	NA	NA	NA	902.43	NA	900.89
MW-25B	590924	NA	891.52	890.68	890.65	NA	893.31	NA	NA	NA	NA
MW-25W	590923	NA	891.63	890.73	890.79	NA	894.44	NA	NA	NA	NA
MW-26B	590925	NA	876.95	877.78	877.28	NA	877.2	NA	NA	NA	NA
MW-26W	592301	NA	877.35	878.26	877.67	NA	877.41	877.8	879.33	878.08	878.62
MW-27B	592303	NA	881.29	880.84	881.05	NA	882.42	NA	NA	NA	NA
MW-27W	592302	NA	881.76	881.12	881.4	NA	880.76	NA	NA	NA	NA
MW-101	619710	NA	895.59	894.25	894.47	NA	NA	NA	NA	NA	NA
MW-102	619711	NA	894.54	893.61	893.85	NA	896	NA	NA	NA	NA

Table 4
Historical Ground Water Elevation

Well Name	Unique Well ID	Dec-12	Jun-12	Apr-13	May-13	Dec-13	Aug-14	May-15	Nov-15	May-16	Aug-16
MW-103	619704	NA	894.01	893.24	893.52	NA	NA	894.73	896.29	895.41	895.98
MW-104	619705	NA	888.9	888.4	888.53	NA	890.91	889.71	890.86	890.27	890.56
MW-105	619709	NA	888.48	888.05	888.22	NA	890.42	889.2	890.27	NA	889.91
MW-106	619712	NA	895.18	894.35	894.43	NA	891.57	NA	NA	896.88	897.47
MW-107	619713	NA	895.33	894.48	894.71	NA	897.12	895.79	898.04	899.07	897.69
MW-108	619714	NA	895.11	894	894.27	NA	896.38	895.46	897.31	896.79	897.01
MW-109	619718	NA	893.58	892.91	893.08	NA	895.92	NA	NA	NA	NA
MW-110	619715	NA	892.37	891.78	891.89	NA	894.34	893.15	894.58	894.38	894.21
MW-111A	684901	NA	881.3	880.8	881.02	NA	NA	881.76	882.9	882.37	882.56
MW-112	619716	NA	881.53	880.89	881.1	NA	882.56	NA	NA	NA	NA
MW-113	619719	NA	893.83	893.11	893.23	NA	895.83	894.56	896.17	895.86	895.84
MW-114	619703	NA	894.66	893.83	894.09	NA	896.88	NA	NA	NA	NA
MW-115	619702	NA	893.51	893.08	893.18	NA	895.88	NA	NA	NA	NA
MW-117	619725	NA	876.64	877.1	876.94	NA	876.3	876.68	877.96	876.89	877.34
MW-118	619726	NA	878.47	879.14	878.61	NA	879.14	878.84	880.41	879.09	879.6
MW-119	619727	NA	877.75	878.55	878.12	NA	877.59	NA	NA	878.22	878.86
MW-120	619728	NA	878.82	879.35	879.04	NA	NA	NA	NA	NA	NA
MW-121	619729	NA	889.14	NA	NA	NA	889.72	NA	NA	890.42	887.81
MW-122	658172	NA	842.17	842.04	842.38	NA	NA	841.46	847.05	839.49	847.66
MW-123	619730	NA	882.33	883.14	883.29	NA	883.1	883.71	884.76	881.77	882.41
MW-124	658173	NA	886.99	887.75	NA	NA	NA	NA	NA	NA	887.05

Notes:	Elevation in feet
	Level taken from remediation well adjacent to the Extraction Well
	Groundwater Elevation Post Extraction Well Shutdown

Appendix 1

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

August 22, 2016

Andrew Tarara
AECOM
800 LaSalle Avenue, Suite 500
Minneapolis, MN 55402

RE: Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Dear Andrew Tarara:
Enclosed are the analytical results for sample(s) received by the laboratory on August 17, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
525 N 8th Street, Salina, KS 67401
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10359395001	**MW-20**	Water	08/17/16 08:30	08/17/16 17:15
10359395002	**MW-21W**	Water	08/17/16 09:15	08/17/16 17:15
10359395003	**MW-21B**	Water	08/17/16 09:45	08/17/16 17:15
10359395004	**MW-19B**	Water	08/17/16 11:55	08/17/16 17:15
10359395005	**EW-5**	Water	08/17/16 11:28	08/17/16 17:15
10359395006	**MW-11W**	Water	08/17/16 14:15	08/17/16 17:15
10359395008	**MW-11B**	Water	08/17/16 13:40	08/17/16 17:15
10359395009	**EW-7**	Water	08/17/16 15:00	08/17/16 17:15
10359395010	**MW-9**	Water	08/17/16 15:05	08/17/16 17:15
10359395011	**EW-1**	Water	08/17/16 12:54	08/17/16 17:15
10359395012	**Dup-1**	Water	08/17/16 00:00	08/17/16 17:15

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SAMPLE ANALYTE COUNT

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10359395001	**MW-20**	Pace SOP	TT3	1	PASI-M
10359395002	**MW-21W**	Pace SOP	TT3	1	PASI-M
10359395003	**MW-21B**	Pace SOP	TT3	1	PASI-M
10359395004	**MW-19B**	Pace SOP	TT3	1	PASI-M
10359395005	**EW-5**	Pace SOP	TT3	1	PASI-M
10359395006	**MW-11W**	Pace SOP	TT3	1	PASI-M
10359395008	**MW-11B**	Pace SOP	TT3	1	PASI-M
10359395009	**EW-7**	Pace SOP	TT3	1	PASI-M
10359395010	**MW-9**	Pace SOP	TT3	1	PASI-M
10359395011	**EW-1**	Pace SOP	TT3	1	PASI-M
10359395012	**Dup-1**	Pace SOP	TT3	1	PASI-M

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SUMMARY OF DETECTION

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
10359395001	**MW-20**					
Pace SOP	Chromium, Hexavalent	450	ug/L	250	08/18/16 14:17	N2
10359395003	**MW-21B**					
Pace SOP	Chromium, Hexavalent	10.8	ug/L	2.5	08/18/16 14:45	N2
10359395004	**MW-19B**					
Pace SOP	Chromium, Hexavalent	1.2	ug/L	0.50	08/18/16 12:39	N2
10359395006	**MW-11W**					
Pace SOP	Chromium, Hexavalent	314	ug/L	50.0	08/18/16 14:50	N2
10359395008	**MW-11B**					
Pace SOP	Chromium, Hexavalent	0.025J	ug/L	0.50	08/18/16 13:02	N2
10359395009	**EW-7**					
Pace SOP	Chromium, Hexavalent	26.1	ug/L	5.0	08/18/16 14:54	N2
10359395010	**MW-9**					
Pace SOP	Chromium, Hexavalent	3.6	ug/L	0.50	08/18/16 13:12	N2
10359395011	**EW-1**					
Pace SOP	Chromium, Hexavalent	168	ug/L	50.0	08/18/16 14:59	N2
10359395012	**Dup-1**					
Pace SOP	Chromium, Hexavalent	599	ug/L	100	08/18/16 15:17	N2

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Method: **Pace SOP**
Description: LC-ICPMS Speciated Chromium
Client: AECOM MN ND
Date: August 22, 2016

General Information:
11 samples were analyzed for Pace SOP. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 431299

N2: The lab does not hold TNI accreditation for this parameter.

- BLANK (Lab ID: 2345806)
  - Chromium, Hexavalent
- Dup-1 (Lab ID: 10359395012)
  - Chromium, Hexavalent
- EW-1 (Lab ID: 10359395011)
  - Chromium, Hexavalent
- EW-5 (Lab ID: 10359395005)
  - Chromium, Hexavalent
- EW-7 (Lab ID: 10359395009)
  - Chromium, Hexavalent
- LCS (Lab ID: 2345807)
  - Chromium, Hexavalent
- MS (Lab ID: 2345809)
  - Chromium, Hexavalent

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PROJECT NARRATIVE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Method: **Pace SOP**
Description: LC-ICPMS Speciated Chromium
Client: AECOM MN ND
Date: August 22, 2016

Analyte Comments:

QC Batch: 431299

N2: The lab does not hold TNI accreditation for this parameter.

- MSD (Lab ID: 2345810)
  - Chromium, Hexavalent
- MW-11B (Lab ID: 10359395008)
  - Chromium, Hexavalent
- MW-11W (Lab ID: 10359395006)
  - Chromium, Hexavalent
- MW-19B (Lab ID: 10359395004)
  - Chromium, Hexavalent
- MW-20 (Lab ID: 10359395001)
  - Chromium, Hexavalent
- MW-21B (Lab ID: 10359395003)
  - Chromium, Hexavalent
- MW-21W (Lab ID: 10359395002)
  - Chromium, Hexavalent
- MW-9 (Lab ID: 10359395010)
  - Chromium, Hexavalent

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Sample: MW-20 **Lab ID: 10359395001** Collected: 08/17/16 08:30 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**450**	ug/L	250	7.2	500		08/18/16 14:17		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Sample: MW-21W **Lab ID: 10359395002** Collected: 08/17/16 09:15 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**<0.014**	ug/L	0.50	0.014	1		08/18/16 12:30		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Sample: MW-21B **Lab ID: 10359395003** Collected: 08/17/16 09:45 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**10.8**	ug/L	2.5	0.072	5		08/18/16 14:45		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Sample: MW-19B **Lab ID: 10359395004** Collected: 08/17/16 11:55 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**1.2**	ug/L	0.50	0.014	1		08/18/16 12:39		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Sample: EW-5 **Lab ID: 10359395005** Collected: 08/17/16 11:28 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**<0.014**	ug/L	0.50	0.014	1		08/18/16 12:43		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Sample: MW-11W **Lab ID: 10359395006** Collected: 08/17/16 14:15 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**314**	ug/L	50.0	1.4	100		08/18/16 14:50		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Sample: MW-11B **Lab ID: 10359395008** Collected: 08/17/16 13:40 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**0.025J**	ug/L	0.50	0.014	1		08/18/16 13:02		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Sample: EW-7 **Lab ID: 10359395009** Collected: 08/17/16 15:00 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**26.1**	ug/L	5.0	0.14	10		08/18/16 14:54		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Sample: MW-9 **Lab ID: 10359395010** Collected: 08/17/16 15:05 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**3.6**	ug/L	0.50	0.014	1		08/18/16 13:12		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Sample: EW-1 **Lab ID: 10359395011** Collected: 08/17/16 12:54 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**168**	ug/L	50.0	1.4	100		08/18/16 14:59		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Sample: Dup-1 **Lab ID: 10359395012** Collected: 08/17/16 00:00 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**599**	ug/L	100	2.9	200		08/18/16 15:17		N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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QUALITY CONTROL DATA

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

QC Batch: 431299 Analysis Method: Pace SOP
QC Batch Method: Pace SOP Analysis Description: LC-ICPMS Speciation
Associated Lab Samples: 10359395001, 10359395002, 10359395003, 10359395004, 10359395005, 10359395006, 10359395008, 10359395009, 10359395010, 10359395011, 10359395012

METHOD BLANK: 2345806 Matrix: Water
Associated Lab Samples: 10359395001, 10359395002, 10359395003, 10359395004, 10359395005, 10359395006, 10359395008, 10359395009, 10359395010, 10359395011, 10359395012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chromium, Hexavalent	ug/L	<0.014	0.50	0.014	08/18/16 12:02	N2

LABORATORY CONTROL SAMPLE: 2345807

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	ug/L	.5	0.49J	99	80-120	N2

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2345809 2345810

Parameter	Units	10359395001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Hexavalent	ug/L	450	250	250	656	702	82	101	75-125	7	20	N2

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

WORKORDER QUALIFIERS

WO: 10359395

[1]	Samples were received outside of the recommended temperature range of 0-6 degrees Celsius. The samples were received from the field on ice, indicating the cool down process had begun.

ANALYTE QUALIFIERS

N2	The lab does not hold TNI accreditation for this parameter.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359395

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10359395001	**MW-20**	Pace SOP	431299		
10359395002	**MW-21W**	Pace SOP	431299		
10359395003	**MW-21B**	Pace SOP	431299		
10359395004	**MW-19B**	Pace SOP	431299		
10359395005	**EW-5**	Pace SOP	431299		
10359395006	**MW-11W**	Pace SOP	431299		
10359395008	**MW-11B**	Pace SOP	431299		
10359395009	**EW-7**	Pace SOP	431299		
10359395010	**MW-9**	Pace SOP	431299		
10359395011	**EW-1**	Pace SOP	431299		
10359395012	**Dup-1**	Pace SOP	431299		

Separate Report

Pace Analytical® www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Hex Chrome.
10359395

Page: 1 of 1

2071399

Section A Required Client Information:

Company: AECOM
Address: 800 LaSalle Ave Suite 500
Minneapolis MN 55402
Email To: andrew.tarara@aecom.com
Phone: 612-376-2000 Fax:
Requested Due Date/TAT: Std

Section B Required Project Information:

Report To: Drew Tarara
Copy To:
Purchase Order No.:
Project Name: M+G Semi-Annual
Project Number: 60430748

Section C Invoice Information:

Attention: same
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #: 27489 #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER ______

Site Location
STATE: ______

Section D Required Client Information

Matrix Codes MATRIX / CODE: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Tissue TS, Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N): N

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	Composite Start DATE	Composite Start TIME	Composite End/Grab DATE	Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test: Speciated Hex Chrome	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	mw-20					8-17-16	0830		1	1								X		001
2	mw-21W					〃	0915		〃	〃								〃		002
3	mw-21B					〃	0945		〃	〃								〃		003
4	mw-19B					〃	1155		〃	〃								〃		004
5	EW-5					〃	1198		〃	〃								〃		005
6	MW-11W					〃	1415		〃	〃								〃		006
7	EW-4					〃	1051		〃	〃								〃		007
8	mw-11B					〃	1340		〃	〃								〃		008
9	EW-7					〃	1500		〃	〃								〃		009
10	MW-9					〃	1505		〃	〃								〃		010
11	EW-1					〃	1254		〃	〃								〃		011
12	Dup-1					〃	–		〃	〃								〃		012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
Hex Chrome to be	Ben Klug / AECOM	8-17-16	1645	[signature] / Pace	8/17/16	1648	5.0	Y	N	Y
Hex Chrome samples	[signature] Pace	8/17/16	1715	[signature] Pace	8/17/16	17:25	5.9	Y	N	Y
have been field filtered.							44	Y	N	Y
							44	Y	N	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Petros Pantos

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 08-17-2016

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Accom

Project #: WO# : 10359395

10359395

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace ☐ SpeeDee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No **Optional:** Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☐ 151401163 ☑ 151401164 ☐ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 5.0, 4.4, 3.3 **Cooler Temp Corrected (°C):** 5.6, 4.4, 3.3, 1.8 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** True **Date and Initials of Person Examining Contents:** CLJ 8/17/16

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☑ Yes	☐ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Ben Klaus Date/Time: 8/18/16 0840

Comments/Resolution:

Cancel sample EW-4

Project Manager Review: Carol Doug **Date:** 8/18/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

www.pacelabs.com

Report Prepared for:

Andrew Tarara
AECOM
800 LaSalle Avenue, Suite 500
Minneapolis MN 55402

REPORT OF LABORATORY ANALYSIS FOR PCDD/PCDF

Report Information:

Pace Project #: 10359402
Sample Receipt Date: 08/17/2016
Client Project #: 60436248
Client Sub PO #: 3000015961
State Cert #: 027-053-137

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

This report has been reviewed by:

September 01, 2016

Scott Unze, Project Manager
(612) 607-6383
(612) 607-6444 (fax)
scott.unze@pacelabs.com

Report Prepared Date:
September 1, 2016

Report of Laboratory Analysis

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

DISCUSSION

This report presents the results from the analyses performed on two samples submitted by a representative of AECOM. The samples were analyzed for the presence or absence of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using USEPA Method 1613B. The reporting limits were based on signal-to-noise measurements. Estimated Maximum Possible Concentration (EMPC) values were treated as positives in the toxic equivalence calculations.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extracts ranged from 47-94%. All of the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1613B. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for variation in recovery and accurate values were obtained.

Values were flagged "I" where incorrect isotope ratios were obtained. Concentrations below the calibration range were flagged "J" and should be regarded as estimates.

A laboratory method blank was prepared and analyzed with each sample batch as part of our routine quality control procedures. The results show that PCDDs and PCDFs were not detected.

Laboratory spike samples were also prepared with the sample batch using clean water that had been fortified with native standard materials. The results show that the spiked native compounds were recovered at 80-127% with relative percent differences of 0.9-14.3%. These results were within the target ranges for the method. Matrix spikes were not prepared with the sample batch.

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE	MN002
California	01155CA	New York (NEL	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

REPORT OF LABORATORY ANALYSIS

Report No.....10359478

Appendix A

Sample Management

CHAIN-OF-CUSTODY / Analytical Request Document

Pace Analytical® www.pacelabs.com

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10359402

Page: 2 of 2

2071398

Section A Required Client Information:

Company:	Aecom
Address:	800 LaSalle Ave Suite 500, Minneapolis, MN 55402
Email To:	andrew.taraca@aecom...
Phone: 612-370-2000	Fax: -
Requested Due Date/TAT:	std

Section B Required Project Information:

Report To:	Drew Tarara
Copy To:	
Purchase Order No.:	
Project Name:	MGC Semi-Annual
Project Number:	60436248

Section C Invoice Information:

Attention:	same
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Carol Davy
Pace Profile #:	27489 #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER ______

Site Location STATE: ______

Section D Required Client Information

Matrix Codes MATRIX / CODE: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Tissue TS, Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	Composite Start DATE	Composite Start TIME	Composite End/Grab DATE	Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	PCP by 8270 SIM	As by 6020A	Dioxin by 1613	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-11B					8-17-16	1340		5	4		1							X	X	X		001
2	~~MW-...~~						~~1415~~		~~2~~	~~2~~									~~X~~				
3	EW-4						1051		3	2		1							X	X			
4	EW-7						1500		2	2									X				
5	EW-9						1515		2	2									X				
6	EW-11						1530		2	2											X		002
7	MW-9						1505		2	2									X				
8	MW-3B						1510		2	2									X				
9	~~MW-3A~~								~~2~~	~~2~~											~~X~~		
10	Dup-1						-		3	2		1							X	X			
11	EW-1						1254		3	2		1							X	X			
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
All As samples have been field filtered.	Ben Kker / Aecom	8-17-16	1645	[signature]	8/17/16	1645	1.8	Y	N	Y
	[signature]	8/17/16	1718	[signature] Pace	8-17-16	17:15				
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Petros Paulos

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 8-17-2016

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Aecom

Project #: WO#: 10359402

10359402

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace ☐ SpeeDee ☐ Other:_____

Tracking Number: _____

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No **Optional:** Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other:_____ **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☐ 151401163 ☑ 151401164 ☐ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 5.6, 4.4, 3.3, 5.9 (+1.8) **Cooler Temp Corrected (°C):** 5.6, 4.4, 5.9, 3.3, 1.6 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** True **Date and Initials of Person Examining Contents:** CM 8/17/16

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: _____ **Date:** 08/18/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
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Reporting Flags

A = Reporting Limit based on signal to noise

B = Less than 10x higher than method blank level

C = Result obtained from confirmation analysis

D = Result obtained from analysis of diluted sample

E = Exceeds calibration range

I = Interference present

J = Estimated value

Nn = Value obtained from additional analysis

P = PCDE Interference

R = Recovery outside target range

S = Peak saturated

U = Analyte not detected

V = Result verified by confirmation analysis

X = %D Exceeds limits

Y = Calculated using average of daily RFs

* = See Discussion

Appendix B

Sample Analysis Summary

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Sample Analysis Results

Client - AECOM

Client's Sample ID	MW-11B		
Lab Sample ID	10359402001		
Filename	F160829B_11		
Injected By	BAL		
Total Amount Extracted	964 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	08/17/2016 13:40
ICAL ID	F160825	Received	08/17/2016 17:15
CCal Filename(s)	F160829A_18	Extracted	08/26/2016 13:30
Method Blank ID	BLANK-51705	Analyzed	08/30/2016 07:57

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	1.10		2,3,7,8-TCDF-13C	2.00	60
Total TCDF	21.00	-----	1.10		2,3,7,8-TCDD-13C	2.00	75
					1,2,3,7,8-PeCDF-13C	2.00	68
2,3,7,8-TCDD	ND	-----	0.58		2,3,4,7,8-PeCDF-13C	2.00	61
Total TCDD	2.40	-----	0.58	J	1,2,3,7,8-PeCDD-13C	2.00	75
					1,2,3,4,7,8-HxCDF-13C	2.00	54
1,2,3,7,8-PeCDF	1.00	-----	0.49	J	1,2,3,6,7,8-HxCDF-13C	2.00	59
2,3,4,7,8-PeCDF	-----	1.10	0.29	IJ	2,3,4,6,7,8-HxCDF-13C	2.00	59
Total PeCDF	1.00	-----	0.39	J	1,2,3,7,8,9-HxCDF-13C	2.00	61
					1,2,3,4,7,8-HxCDD-13C	2.00	53
1,2,3,7,8-PeCDD	0.78	-----	0.34	J	1,2,3,6,7,8-HxCDD-13C	2.00	56
Total PeCDD	1.70	-----	0.34	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	53
					1,2,3,4,7,8,9-HpCDF-13C	2.00	55
1,2,3,4,7,8-HxCDF	2.20	-----	0.24	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	62
1,2,3,6,7,8-HxCDF	1.80	-----	0.34	J	OCDD-13C	4.00	47
2,3,4,6,7,8-HxCDF	2.90	-----	0.28	J			
1,2,3,7,8,9-HxCDF	-----	1.00	0.40	IJ	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	43.00	-----	0.32	J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	-----	0.74	0.55	IJ	2,3,7,8-TCDD-37Cl4	0.20	75
1,2,3,6,7,8-HxCDD	11.00	-----	0.55	J			
1,2,3,7,8,9-HxCDD	5.40	-----	0.63	J			
Total HxCDD	57.00	-----	0.58				
1,2,3,4,6,7,8-HpCDF	57.00	-----	0.58		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	2.50	-----	0.63	J	Equivalence: 11 pg/L		
Total HpCDF	120.00	-----	0.60		(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	550.00	-----	0.49				
Total HpCDD	810.00	-----	0.49				
OCDF	62.00	-----	0.70	J			
OCDD	4000.00	-----	0.89				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
EDL = Estimated Detection Limit

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

J = Estimated value
I = Interference present

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Sample Analysis Results

Client - AECOM

Client's Sample ID	EW-11		
Lab Sample ID	10359402002		
Filename	F160829B_12		
Injected By	BAL		
Total Amount Extracted	937 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	08/17/2016 15:30
ICAL ID	F160825	Received	08/17/2016 17:15
CCal Filename(s)	F160829A_18	Extracted	08/26/2016 13:30
Method Blank ID	BLANK-51705	Analyzed	08/30/2016 08:47

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.61		2,3,7,8-TCDF-13C	2.00	73
Total TCDF	ND	-----	0.61		2,3,7,8-TCDD-13C	2.00	90
					1,2,3,7,8-PeCDF-13C	2.00	85
2,3,7,8-TCDD	ND	-----	0.60		2,3,4,7,8-PeCDF-13C	2.00	78
Total TCDD	ND	-----	0.60		1,2,3,7,8-PeCDD-13C	2.00	94
					1,2,3,4,7,8-HxCDF-13C	2.00	68
1,2,3,7,8-PeCDF	ND	-----	0.39		1,2,3,6,7,8-HxCDF-13C	2.00	75
2,3,4,7,8-PeCDF	ND	-----	0.20		2,3,4,6,7,8-HxCDF-13C	2.00	73
Total PeCDF	ND	-----	0.30		1,2,3,7,8,9-HxCDF-13C	2.00	75
					1,2,3,4,7,8-HxCDD-13C	2.00	69
1,2,3,7,8-PeCDD	ND	-----	0.18		1,2,3,6,7,8-HxCDD-13C	2.00	71
Total PeCDD	ND	-----	0.18		1,2,3,4,6,7,8-HpCDF-13C	2.00	68
					1,2,3,4,7,8,9-HpCDF-13C	2.00	68
1,2,3,4,7,8-HxCDF	0.72	-----	0.19	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	78
1,2,3,6,7,8-HxCDF	ND	-----	0.25		OCDD-13C	4.00	57
2,3,4,6,7,8-HxCDF	ND	-----	0.19				
1,2,3,7,8,9-HxCDF	ND	-----	0.35		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	0.72	-----	0.25	J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	0.28		2,3,7,8-TCDD-37Cl4	0.20	84
1,2,3,6,7,8-HxCDD	0.38	-----	0.26	J			
1,2,3,7,8,9-HxCDD	ND	-----	0.24				
Total HxCDD	0.83	-----	0.26	J			
1,2,3,4,6,7,8-HpCDF	1.50	-----	0.33	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	0.39		Equivalence: 0.27 pg/L		
Total HpCDF	4.50	-----	0.36	J	(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	11.00	-----	0.71	J			
Total HpCDD	19.00	-----	0.71	J			
OCDF	3.60	-----	0.64	J			
OCDD	110.00	-----	1.60				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
EDL = Estimated Detection Limit

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

J = Estimated value

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Blank Analysis Results

Lab Sample ID	BLANK-51705	Matrix	Water
Filename	Y160829B_04	Dilution	NA
Total Amount Extracted	1030 mL	Extracted	08/26/2016 13:30
ICAL ID	Y160816A	Analyzed	08/30/2016 04:21
CCal Filename(s)	Y160829A_17	Injected By	SMT

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	1.30	2,3,7,8-TCDF-13C	2.00	70
Total TCDF	ND	-----	1.30	2,3,7,8-TCDD-13C	2.00	83
				1,2,3,7,8-PeCDF-13C	2.00	69
2,3,7,8-TCDD	ND	-----	0.61	2,3,4,7,8-PeCDF-13C	2.00	65
Total TCDD	ND	-----	0.61	1,2,3,7,8-PeCDD-13C	2.00	75
				1,2,3,4,7,8-HxCDF-13C	2.00	76
1,2,3,7,8-PeCDF	ND	-----	0.88	1,2,3,6,7,8-HxCDF-13C	2.00	77
2,3,4,7,8-PeCDF	ND	-----	0.73	2,3,4,6,7,8-HxCDF-13C	2.00	78
Total PeCDF	ND	-----	0.80	1,2,3,7,8,9-HxCDF-13C	2.00	83
				1,2,3,4,7,8-HxCDD-13C	2.00	77
1,2,3,7,8-PeCDD	ND	-----	1.50	1,2,3,6,7,8-HxCDD-13C	2.00	70
Total PeCDD	ND	-----	1.50	1,2,3,4,6,7,8-HpCDF-13C	2.00	79
				1,2,3,4,7,8,9-HpCDF-13C	2.00	82
1,2,3,4,7,8-HxCDF	ND	-----	0.59	1,2,3,4,6,7,8-HpCDD-13C	2.00	86
1,2,3,6,7,8-HxCDF	ND	-----	0.60	OCDD-13C	4.00	74
2,3,4,6,7,8-HxCDF	ND	-----	0.78			
1,2,3,7,8,9-HxCDF	ND	-----	1.10	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	-----	0.76	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	1.60	2,3,7,8-TCDD-37Cl4	0.20	82
1,2,3,6,7,8-HxCDD	ND	-----	1.60			
1,2,3,7,8,9-HxCDD	ND	-----	1.60			
Total HxCDD	ND	-----	1.60			
1,2,3,4,6,7,8-HpCDF	ND	-----	1.10	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	2.00	Equivalence: 0.00 pg/L		
Total HpCDF	ND	-----	1.50	(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	ND	-----	2.00			
Total HpCDD	ND	-----	2.00			
OCDF	ND	-----	1.60			
OCDD	ND	-----	4.50			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
EDL = Estimated Detection Limit

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-51706		
Filename	Y160829B_01	Matrix	Water
Total Amount Extracted	1030 mL	Dilution	NA
ICAL ID	Y160816A	Extracted	08/26/2016 13:30
CCal Filename	Y160829A_17	Analyzed	08/30/2016 02:12
Method Blank ID	BLANK-51705	Injected By	SMT

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	11	7.5	15.8	107
2,3,7,8-TCDD	10	8.0	6.7	15.8	80
1,2,3,7,8-PeCDF	50	53	40.0	67.0	106
2,3,4,7,8-PeCDF	50	54	34.0	80.0	107
1,2,3,7,8-PeCDD	50	47	35.0	71.0	95
1,2,3,4,7,8-HxCDF	50	53	36.0	67.0	106
1,2,3,6,7,8-HxCDF	50	53	42.0	65.0	106
2,3,4,6,7,8-HxCDF	50	49	35.0	78.0	98
1,2,3,7,8,9-HxCDF	50	47	39.0	65.0	94
1,2,3,4,7,8-HxCDD	50	55	35.0	82.0	109
1,2,3,6,7,8-HxCDD	50	55	38.0	67.0	110
1,2,3,7,8,9-HxCDD	50	56	32.0	81.0	112
1,2,3,4,6,7,8-HpCDF	50	53	41.0	61.0	105
1,2,3,4,7,8,9-HpCDF	50	48	39.0	69.0	96
1,2,3,4,6,7,8-HpCDD	50	49	35.0	70.0	97
OCDF	100	100	63.0	170.0	103
OCDD	100	100	78.0	144.0	101
2,3,7,8-TCDD-37Cl4	10	8.6	3.1	19.1	86
2,3,7,8-TCDF-13C	100	72	22.0	152.0	72
2,3,7,8-TCDD-13C	100	87	20.0	175.0	87
1,2,3,7,8-PeCDF-13C	100	72	21.0	192.0	72
2,3,4,7,8-PeCDF-13C	100	66	13.0	328.0	66
1,2,3,7,8-PeCDD-13C	100	74	21.0	227.0	74
1,2,3,4,7,8-HxCDF-13C	100	75	19.0	202.0	75
1,2,3,6,7,8-HxCDF-13C	100	75	21.0	159.0	75
2,3,4,6,7,8-HxCDF-13C	100	77	22.0	176.0	77
1,2,3,7,8,9-HxCDF-13C	100	81	17.0	205.0	81
1,2,3,4,7,8-HxCDD-13C	100	73	21.0	193.0	73
1,2,3,6,7,8-HxCDD-13C	100	70	25.0	163.0	70
1,2,3,4,6,7,8-HpCDF-13C	100	75	21.0	158.0	75
1,2,3,4,7,8,9-HpCDF-13C	100	72	20.0	186.0	72
1,2,3,4,6,7,8-HpCDD-13C	100	78	26.0	166.0	78
OCDD-13C	200	110	26.0	397.0	56

Cs = Concentration Spiked (ng/mL)
Cr = Concentration Recovered (ng/mL)
Rec. = Recovery (Expressed as Percent)
Control Limit Reference: Method 1613, Table 6, 10/94 Revision
R = Recovery outside of control limits
Nn = Value obtained from additional analysis
* = See Discussion

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCSD-51707		
Filename	Y160829B_02	Matrix	Water
Total Amount Extracted	1060 mL	Dilution	NA
ICAL ID	Y160816A	Extracted	08/26/2016 13:30
CCal Filename	Y160829A_17	Analyzed	08/30/2016 02:55
Method Blank ID	BLANK-51705	Injected By	SMT

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	11	7.5	15.8	113
2,3,7,8-TCDD	10	8.5	6.7	15.8	85
1,2,3,7,8-PeCDF	50	56	40.0	67.0	112
2,3,4,7,8-PeCDF	50	56	34.0	80.0	113
1,2,3,7,8-PeCDD	50	49	35.0	71.0	97
1,2,3,4,7,8-HxCDF	50	53	36.0	67.0	107
1,2,3,6,7,8-HxCDF	50	55	42.0	65.0	110
2,3,4,6,7,8-HxCDF	50	51	35.0	78.0	102
1,2,3,7,8,9-HxCDF	50	47	39.0	65.0	93
1,2,3,4,7,8-HxCDD	50	49	35.0	82.0	99
1,2,3,6,7,8-HxCDD	50	64	38.0	67.0	127
1,2,3,7,8,9-HxCDD	50	60	32.0	81.0	121
1,2,3,4,6,7,8-HpCDF	50	56	41.0	61.0	111
1,2,3,4,7,8,9-HpCDF	50	51	39.0	69.0	102
1,2,3,4,6,7,8-HpCDD	50	50	35.0	70.0	100
OCDF	100	110	63.0	170.0	109
OCDD	100	110	78.0	144.0	109
2,3,7,8-TCDD-37Cl4	10	8.9	3.1	19.1	89
2,3,7,8-TCDF-13C	100	74	22.0	152.0	74
2,3,7,8-TCDD-13C	100	87	20.0	175.0	87
1,2,3,7,8-PeCDF-13C	100	74	21.0	192.0	74
2,3,4,7,8-PeCDF-13C	100	69	13.0	328.0	69
1,2,3,7,8-PeCDD-13C	100	81	21.0	227.0	81
1,2,3,4,7,8-HxCDF-13C	100	74	19.0	202.0	74
1,2,3,6,7,8-HxCDF-13C	100	76	21.0	159.0	76
2,3,4,6,7,8-HxCDF-13C	100	77	22.0	176.0	77
1,2,3,7,8,9-HxCDF-13C	100	80	17.0	205.0	80
1,2,3,4,7,8-HxCDD-13C	100	77	21.0	193.0	77
1,2,3,6,7,8-HxCDD-13C	100	66	25.0	163.0	66
1,2,3,4,6,7,8-HpCDF-13C	100	75	21.0	158.0	75
1,2,3,4,7,8,9-HpCDF-13C	100	73	20.0	186.0	73
1,2,3,4,6,7,8-HpCDD-13C	100	84	26.0	166.0	84
OCDD-13C	200	120	26.0	397.0	60

Cs = Concentration Spiked (ng/mL)
Cr = Concentration Recovered (ng/mL)
Rec. = Recovery (Expressed as Percent)
Control Limit Reference: Method 1613, Table 6, 10/94 Revision
R = Recovery outside of control limits
Nn = Value obtained from additional analysis
* = See Discussion

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B

Spike Recovery Relative Percent Difference (RPD) Results

Client	AECOM		
Spike 1 ID	LCS-51706	Spike 2 ID	LCSD-51707
Spike 1 Filename	Y160829B_01	Spike 2 Filename	Y160829B_02

Compound	Spike 1 %REC	Spike 2 %REC	%RPD
2,3,7,8-TCDF	107	113	5.5
2,3,7,8-TCDD	80	85	6.1
1,2,3,7,8-PeCDF	106	112	5.5
2,3,4,7,8-PeCDF	107	113	5.5
1,2,3,7,8-PeCDD	95	97	2.1
1,2,3,4,7,8-HxCDF	106	107	0.9
1,2,3,6,7,8-HxCDF	106	110	3.7
2,3,4,6,7,8-HxCDF	98	102	4.0
1,2,3,7,8,9-HxCDF	94	93	1.1
1,2,3,4,7,8-HxCDD	109	99	9.6
1,2,3,6,7,8-HxCDD	110	127	14.3
1,2,3,7,8,9-HxCDD	112	121	7.7
1,2,3,4,6,7,8-HpCDF	105	111	5.6
1,2,3,4,7,8,9-HpCDF	96	102	6.1
1,2,3,4,6,7,8-HpCDD	97	100	3.0
OCDF	103	109	5.7
OCDD	101	109	7.6

%REC = Percent Recovered
RPD = The difference between the two values divided by the mean value

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

August 25, 2016

Andrew Tarara
AECOM
800 LaSalle Avenue, Suite 500
Minneapolis, MN 55402

RE: Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Dear Andrew Tarara:
Enclosed are the analytical results for sample(s) received by the laboratory on August 17, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
525 N 8th Street, Salina, KS 67401
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10359403001	**MW-110**	Water	08/16/16 10:25	08/17/16 17:55
10359403002	**MW-113**	Water	08/16/16 11:20	08/17/16 17:55
10359403005	**MW-111A**	Water	08/16/16 12:20	08/17/16 17:55
10359403006	**MW-122**	Water	08/16/16 14:35	08/17/16 17:55
10359403007	**MW-123**	Water	08/16/16 16:25	08/17/16 17:15
10359403008	**MW-20**	Water	08/17/16 08:30	08/17/16 17:15
10359403009	**MW-21W**	Water	08/17/16 09:15	08/17/16 17:15
10359403010	**MW-21B**	Water	08/17/16 09:45	08/17/16 17:15
10359403011	**MW-19B**	Water	08/17/16 11:55	08/17/16 17:15
10359403012	**EW-5**	Water	08/17/16 11:28	08/17/16 17:15
10359403013	**MW-11B**	Water	08/17/16 13:40	08/17/16 17:15
10359403015	**EW-7**	Water	08/17/16 15:00	08/17/16 17:15
10359403016	**EW-9**	Water	08/17/16 15:15	08/17/16 17:15
10359403017	**MW-9**	Water	08/17/16 15:05	08/17/16 17:15
10359403018	**MW-3B**	Water	08/17/16 15:40	08/17/16 17:15
10359403019	**DUP-1**	Water	08/17/16 00:00	08/17/16 17:15
10359403020	**EW-1**	Water	08/17/16 12:54	08/17/16 17:15

Pace Analytical Services, Inc.
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Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10359403001	**MW-110**	EPA 8270D by SIM	JLR	2	PASI-M
10359403002	**MW-113**	EPA 8270D by SIM	JLR	2	PASI-M
10359403005	**MW-111A**	EPA 8270D by SIM	JLR	2	PASI-M
10359403006	**MW-122**	EPA 8270D by SIM	JLR	2	PASI-M
10359403007	**MW-123**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359403008	**MW-20**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359403009	**MW-21W**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359403010	**MW-21B**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359403011	**MW-19B**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359403012	**EW-5**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359403013	**MW-11B**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359403015	**EW-7**	EPA 8270D by SIM	JLR	2	PASI-M
10359403016	**EW-9**	EPA 8270D by SIM	JLR	2	PASI-M
10359403017	**MW-9**	EPA 8270D by SIM	JLR	2	PASI-M
10359403018	**MW-3B**	EPA 8270D by SIM	JLR	2	PASI-M
10359403019	**DUP-1**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359403020	**EW-1**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M

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SUMMARY OF DETECTION

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
10359403007	**MW-123**					
EPA 6020A	Arsenic, Dissolved	6.3	ug/L	0.50	08/24/16 23:13	
10359403008	**MW-20**					
EPA 6020A	Arsenic, Dissolved	1.2	ug/L	0.50	08/24/16 23:16	
EPA 8270D by SIM	Pentachlorophenol	36.6	ug/L	6.1	08/25/16 13:49	
10359403009	**MW-21W**					
EPA 6020A	Arsenic, Dissolved	0.39J	ug/L	0.50	08/24/16 23:19	
EPA 8270D by SIM	Pentachlorophenol	3.5	ug/L	0.62	08/24/16 17:49	
10359403010	**MW-21B**					
EPA 6020A	Arsenic, Dissolved	0.51	ug/L	0.50	08/24/16 23:22	
EPA 8270D by SIM	Pentachlorophenol	7.5	ug/L	0.62	08/24/16 18:09	
10359403011	**MW-19B**					
EPA 6020A	Arsenic, Dissolved	0.74	ug/L	0.50	08/24/16 23:25	
EPA 8270D by SIM	Pentachlorophenol	35.8	ug/L	6.2	08/25/16 14:09	
10359403012	**EW-5**					
EPA 6020A	Arsenic, Dissolved	1.3	ug/L	0.50	08/24/16 23:28	
10359403013	**MW-11B**					
EPA 6020A	Arsenic, Dissolved	1.1	ug/L	0.50	08/24/16 23:31	
EPA 8270D by SIM	Pentachlorophenol	5880	ug/L	615	08/25/16 13:08	
10359403015	**EW-7**					
EPA 8270D by SIM	Pentachlorophenol	0.56J	ug/L	0.62	08/25/16 11:26	
10359403016	**EW-9**					
EPA 8270D by SIM	Pentachlorophenol	31800	ug/L	3450	08/25/16 13:28	
10359403017	**MW-9**					
EPA 8270D by SIM	Pentachlorophenol	0.33J	ug/L	0.63	08/25/16 11:46	
10359403018	**MW-3B**					
EPA 8270D by SIM	Pentachlorophenol	307	ug/L	31.1	08/25/16 12:48	
10359403019	**DUP-1**					
EPA 6020A	Arsenic, Dissolved	1.1	ug/L	0.50	08/24/16 23:33	
EPA 8270D by SIM	Pentachlorophenol	29.6	ug/L	6.1	08/25/16 14:30	
10359403020	**EW-1**					
EPA 6020A	Arsenic, Dissolved	2.1	ug/L	0.50	08/24/16 23:42	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Method: **EPA 6020A**
Description: 6020A MET ICPMS, Dissolved
Client: AECOM MN ND
Date: August 25, 2016

General Information:
9 samples were analyzed for EPA 6020A. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3020 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

PROJECT NARRATIVE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Method: **EPA 8270D by SIM**
Description: 8270D MSSV PCP by SIM
Client: AECOM MN ND
Date: August 25, 2016

General Information:
17 samples were analyzed for EPA 8270D by SIM. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3510C with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

QC Batch: 431931

S4: Surrogate recovery not evaluated against control limits due to sample dilution.

- EW-9 (Lab ID: 10359403016)
  - 2,4,6-Tribromophenol (S)
- MW-11B (Lab ID: 10359403013)
  - 2,4,6-Tribromophenol (S)
- MW-19B (Lab ID: 10359403011)
  - 2,4,6-Tribromophenol (S)
- MW-3B (Lab ID: 10359403018)
  - 2,4,6-Tribromophenol (S)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Pace Analytical Services, Inc.
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Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Method: **EPA 8270D by SIM**
Description: 8270D MSSV PCP by SIM
Client: AECOM MN ND
Date: August 25, 2016

QC Batch: 431931

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10359403002

R1: RPD value was outside control limits.

- MSD (Lab ID: 2349031)
  - Pentachlorophenol

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, Inc.
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Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: MW-110 **Lab ID: 10359403001** Collected: 08/16/16 10:25 Received: 08/17/16 17:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.64	0.30	1	08/23/16 08:21	08/24/16 15:06	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	75	%.	46-125		1	08/23/16 08:21	08/24/16 15:06	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: MW-113 **Lab ID: 10359403002** Collected: 08/16/16 11:20 Received: 08/17/16 17:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.32**	ug/L	0.67	0.32	1	08/23/16 08:21	08/24/16 15:26	87-86-5	R1
Surrogates									
2,4,6-Tribromophenol (S)	88	%.	46-125		1	08/23/16 08:21	08/24/16 15:26	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: MW-111A **Lab ID: 10359403005** Collected: 08/16/16 12:20 Received: 08/17/16 17:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.65	0.30	1	08/23/16 08:21	08/24/16 16:27	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	92	%.	46-125		1	08/23/16 08:21	08/24/16 16:27	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: MW-122 **Lab ID: 10359403006** Collected: 08/16/16 14:35 Received: 08/17/16 17:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.31**	ug/L	0.67	0.31	1	08/23/16 08:21	08/24/16 16:48	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	83	%.	46-125		1	08/23/16 08:21	08/24/16 16:48	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: MW-123 **Lab ID: 10359403007** Collected: 08/16/16 16:25 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**6.3**	ug/L	0.50	0.091	1	08/24/16 11:04	08/24/16 23:13	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.31**	ug/L	0.67	0.31	1	08/23/16 08:21	08/24/16 17:08	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	73	%.	46-125		1	08/23/16 08:21	08/24/16 17:08	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: MW-20 **Lab ID: 10359403008** Collected: 08/17/16 08:30 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**1.2**	ug/L	0.50	0.091	1	08/24/16 11:04	08/24/16 23:16	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**36.6**	ug/L	6.1	2.9	10	08/23/16 08:21	08/25/16 13:49	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	87	%.	46-125		10	08/23/16 08:21	08/25/16 13:49	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: MW-21W **Lab ID: 10359403009** Collected: 08/17/16 09:15 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.39J**	ug/L	0.50	0.091	1	08/24/16 11:04	08/24/16 23:19	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**3.5**	ug/L	0.62	0.29	1	08/23/16 08:21	08/24/16 17:49	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	92	%.	46-125		1	08/23/16 08:21	08/24/16 17:49	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: MW-21B **Lab ID: 10359403010** Collected: 08/17/16 09:45 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.51**	ug/L	0.50	0.091	1	08/24/16 11:04	08/24/16 23:22	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**7.5**	ug/L	0.62	0.29	1	08/23/16 08:21	08/24/16 18:09	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	86	%.	46-125		1	08/23/16 08:21	08/24/16 18:09	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: MW-19B **Lab ID: 10359403011** Collected: 08/17/16 11:55 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.74**	ug/L	0.50	0.091	1	08/24/16 11:04	08/24/16 23:25	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**35.8**	ug/L	6.2	2.9	10	08/23/16 08:21	08/25/16 14:09	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	0	%.	46-125		10	08/23/16 08:21	08/25/16 14:09	118-79-6	S4

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: EW-5 **Lab ID: 10359403012** Collected: 08/17/16 11:28 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**1.3**	ug/L	0.50	0.091	1	08/24/16 11:04	08/24/16 23:28	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	08/23/16 08:21	08/24/16 18:50	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	87	%.	46-125		1	08/23/16 08:21	08/24/16 18:50	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: MW-11B **Lab ID: 10359403013** Collected: 08/17/16 13:40 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**1.1**	ug/L	0.50	0.091	1	08/24/16 11:04	08/24/16 23:31	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**5880**	ug/L	615	290	1000	08/23/16 08:21	08/25/16 13:08	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	0	%.	46-125		1000	08/23/16 08:21	08/25/16 13:08	118-79-6	S4

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: EW-7 **Lab ID: 10359403015** Collected: 08/17/16 15:00 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**0.56J**	ug/L	0.62	0.29	1	08/23/16 08:21	08/25/16 11:26	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	101	%.	46-125		1	08/23/16 08:21	08/25/16 11:26	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: EW-9 **Lab ID: 10359403016** Collected: 08/17/16 15:15 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**31800**	ug/L	3450	1630	500	08/23/16 08:21	08/25/16 13:28	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	0	%.	46-125		500	08/23/16 08:21	08/25/16 13:28	118-79-6	S4

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: MW-9 **Lab ID: 10359403017** Collected: 08/17/16 15:05 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**0.33J**	ug/L	0.63	0.30	1	08/23/16 08:21	08/25/16 11:46	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	88	%.	46-125		1	08/23/16 08:21	08/25/16 11:46	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: MW-3B **Lab ID: 10359403018** Collected: 08/17/16 15:40 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**307**	ug/L	31.1	14.7	50	08/23/16 08:21	08/25/16 12:48	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	0	%.	46-125		50	08/23/16 08:21	08/25/16 12:48	118-79-6	S4

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: DUP-1 **Lab ID: 10359403019** Collected: 08/17/16 00:00 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**1.1**	ug/L	0.50	0.091	1	08/24/16 11:04	08/24/16 23:33	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**29.6**	ug/L	6.1	2.9	10	08/23/16 08:21	08/25/16 14:30	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	81	%.	46-125		10	08/23/16 08:21	08/25/16 14:30	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Sample: EW-1 **Lab ID: 10359403020** Collected: 08/17/16 12:54 Received: 08/17/16 17:15 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**2.1**	ug/L	0.50	0.091	1	08/24/16 11:04	08/24/16 23:42	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.61	0.29	1	08/23/16 08:21	08/25/16 12:07	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	84	%.	46-125		1	08/23/16 08:21	08/25/16 12:07	118-79-6	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

QC Batch: 431430 Analysis Method: EPA 6020A
QC Batch Method: EPA 3020 Analysis Description: 6020A Water Dissolved UPD4
Associated Lab Samples: 10359403007, 10359403008, 10359403009, 10359403010, 10359403011, 10359403012, 10359403013, 10359403019, 10359403020

METHOD BLANK: 2346674 Matrix: Water
Associated Lab Samples: 10359403007, 10359403008, 10359403009, 10359403010, 10359403011, 10359403012, 10359403013, 10359403019, 10359403020

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	ug/L	<0.091	0.50	0.091	08/24/16 23:08	

LABORATORY CONTROL SAMPLE: 2346675

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	ug/L	100	103	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2346676 2346677

Parameter	Units	10359548006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	ug/L	0.53	100	100	103	108	102	108	75-125	5	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

QC Batch: 431931 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3510C Analysis Description: 8270D PCP MSSV
Associated Lab Samples: 10359403001, 10359403002, 10359403005, 10359403006, 10359403007, 10359403008, 10359403009, 10359403010, 10359403011, 10359403012, 10359403013, 10359403015, 10359403016, 10359403017, 10359403018, 10359403019, 10359403020

METHOD BLANK: 2349028 Matrix: Water
Associated Lab Samples: 10359403001, 10359403002, 10359403005, 10359403006, 10359403007, 10359403008, 10359403009, 10359403010, 10359403011, 10359403012, 10359403013, 10359403015, 10359403016, 10359403017, 10359403018, 10359403019, 10359403020

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Pentachlorophenol	ug/L	<0.28	0.60	0.28	08/24/16 11:42	
2,4,6-Tribromophenol (S)	%.	81	46-125		08/24/16 11:42	

LABORATORY CONTROL SAMPLE: 2349029

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Pentachlorophenol	ug/L	1	0.53J	53	30-125	
2,4,6-Tribromophenol (S)	%.			79	46-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2349030 2349031

Parameter	Units	10359403002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Pentachlorophenol	ug/L	<0.32	1.1	1	1.1	0.72	81	57	30-125	37	30	R1
2,4,6-Tribromophenol (S)	%.						94	92	46-125			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

R1	RPD value was outside control limits.
S4	Surrogate recovery not evaluated against control limits due to sample dilution.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359403

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10359403007	**MW-123**	EPA 3020	431430	EPA 6020A	432319
10359403008	**MW-20**	EPA 3020	431430	EPA 6020A	432319
10359403009	**MW-21W**	EPA 3020	431430	EPA 6020A	432319
10359403010	**MW-21B**	EPA 3020	431430	EPA 6020A	432319
10359403011	**MW-19B**	EPA 3020	431430	EPA 6020A	432319
10359403012	**EW-5**	EPA 3020	431430	EPA 6020A	432319
10359403013	**MW-11B**	EPA 3020	431430	EPA 6020A	432319
10359403019	**DUP-1**	EPA 3020	431430	EPA 6020A	432319
10359403020	**EW-1**	EPA 3020	431430	EPA 6020A	432319
10359403001	**MW-110**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403002	**MW-113**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403005	**MW-111A**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403006	**MW-122**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403007	**MW-123**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403008	**MW-20**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403009	**MW-21W**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403010	**MW-21B**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403011	**MW-19B**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403012	**EW-5**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403013	**MW-11B**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403015	**EW-7**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403016	**EW-9**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403017	**MW-9**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403018	**MW-3B**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403019	**DUP-1**	EPA 3510C	431931	EPA 8270D by SIM	432258
10359403020	**EW-1**	EPA 3510C	431931	EPA 8270D by SIM	432258

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10359403

Page: 1 of 2

2071400

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: AECOM	Report To: Drew Tarara	Attention: Dame
Address: 300 LaSalle Ave S. Ste 500 Minneapolis, MN 55403	Copy To:	Company Name:
		Address:
Email To: Andrew.tarara@aecom.com	Purchase Order No.:	Pace Quote Reference:
Phone: 612-376-2000 Fax: -	Project Name: M&G Semi-Annual	Pace Project Manager: Carol Dary
Requested Due Date/TAT: STD	Project Number: 60436248	Pace Profile #: 27489 #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER

☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: _____

Requested Analysis Filtered (Y/N)

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	RSK by 6700 SIM	As by 6020A	Diss As by 6020A	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-110				8-16-16	1035			2	2									X				W1
2	MW-113					1120																	W2
3	MS-2					1120																	W3
4	MSD-2					1120																	W4
5	MW-111A					1220																	W5
6	MW-122					1435																	W6
7	MW-123					1625			3			1								X			W7
8	MW-20				8-17-16	0830														1			W8
9	MW-21W					0915														1			W9
10	MW-21B					0945														1			W10
11	MW-195					1155														1			W11
12	EW-5					1128														1			W12

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
All As samples have been field filtered	B. Kiker / AECOM	8-17-16	1645		8/17/16	1645	3.3	Y	N	Y
	G&P PACE	8/17/16	1715		8/17/16	1715				

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Petros Paulos

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 08-17-2016

ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of 2

2071398

Section A Required Client Information:

Company:	Arcom
Address:	800 LaSalle Ave Suite 500, Minneapolis MN 55402
Email To:	andrew.tarara@aecom...
Phone:	612-376-2000 Fax:
Requested Due Date/TAT:	std

Section B Required Project Information:

Report To:	Drew Tarara
Copy To:	
Purchase Order No.:	
Project Name:	MHG Semi-Annual
Project Number:	60436248

Section C Invoice Information:

Attention:	Same
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Carol Davy
Pace Profile #:	27489 #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER ______

Site Location STATE: ______

Section D Required Client Information

Matrix Codes MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	Composite Start DATE	Composite Start TIME	Composite End/Grab DATE	Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	PCP by 8270 SIM	As by 6020A	Dioxin by 1613	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-11B					8-17-16	1340		5	4		1							X	X	X		013
2	~~MW-[illegible]~~						~~1415~~		~~2~~	~~2~~									~~X~~				
3	EW-4						1051		3	2		1							X	X			014
4	EW-7						1500		2	2									X				015
5	EW-9						1519		2	2									X				016
6	EW-11						1530		2	2											X		
7	MW-9						1505		2	2									X				017
8	MW-3B						1540		2	2									X				018
9	~~MW-3[illegible]~~								~~2~~	~~2~~											~~X~~		
10	Dup-1						–		3	2		1							X	X			019
11	EW-1						1254		3	2		1							X	X			020
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
All As samples have been field filtered.	Ben Kba / Aecom	8-17-16	1645	[signature]	8/17/16	1645	1.8	Y	N	Y
	G Allmer	8/17/16	1718							

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Petros Paulos

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 8-17-2016

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Aecom

Project #: WO#: 10359403

10359403

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace ☐ SpeeDee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No **Optional:** Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☐ 151401163 ☐ B88A912167504 ☑ 151401164 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.6, 4.4, 3.3, 3.5 **Cooler Temp Corrected (°C):** 5.6, 4.4, 3.3, 3.1 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** True **Date and Initials of Person Examining Contents:** Clif 8/17/16

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # 16/16
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Ben Klaus Date/Time: 8/18/16 0840

Comments/Resolution:

Cancel EW-4. Samples MS2 and MSD2 are MS/MSD set for MW-113

Project Manager Review: Date: 8/18/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

August 22, 2016

Andrew Tarara
AECOM
800 LaSalle Avenue, Suite 500
Minneapolis, MN 55402

RE: Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Dear Andrew Tarara:
Enclosed are the analytical results for sample(s) received by the laboratory on August 18, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
525 N 8th Street, Salina, KS 67401
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10359540001	**EW-16**	Water	08/18/16 08:25	08/18/16 17:30
10359540002	**EW-18**	Water	08/18/16 09:21	08/18/16 17:30
10359540003	**EW-15**	Water	08/18/16 10:10	08/18/16 17:30
10359540004	**EW-12**	Water	08/18/16 12:34	08/18/16 17:30
10359540005	**FB-1**	Water	08/18/16 13:30	08/18/16 17:30
10359540006	**EW-4**	Water	08/18/16 13:50	08/18/16 17:30
10359540007	**EW-3B**	Water	08/18/16 14:26	08/18/16 17:30
10359540008	**Dup-2**	Water	08/18/16 00:00	08/18/16 17:30

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10359540001	**EW-16**	Pace SOP	TT3	1	PASI-M
10359540002	**EW-18**	Pace SOP	TT3	1	PASI-M
10359540003	**EW-15**	Pace SOP	TT3	1	PASI-M
10359540004	**EW-12**	Pace SOP	TT3	1	PASI-M
10359540005	**FB-1**	Pace SOP	TT3	1	PASI-M
10359540006	**EW-4**	Pace SOP	TT3	1	PASI-M
10359540007	**EW-3B**	Pace SOP	TT3	1	PASI-M
10359540008	**Dup-2**	Pace SOP	TT3	1	PASI-M

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SUMMARY OF DETECTION

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
10359540001	**EW-16**					
Pace SOP	Chromium, Hexavalent	0.12J	ug/L	0.50	08/18/16 18:51	N2
10359540003	**EW-15**					
Pace SOP	Chromium, Hexavalent	0.91	ug/L	0.50	08/18/16 19:00	N2
10359540004	**EW-12**					
Pace SOP	Chromium, Hexavalent	0.32J	ug/L	0.50	08/18/16 19:04	N2
10359540006	**EW-4**					
Pace SOP	Chromium, Hexavalent	8.9	ug/L	2.5	08/18/16 20:04	N2

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Method: **Pace SOP**
Description: LC-ICPMS Speciated Chromium
Client: AECOM MN ND
Date: August 22, 2016

General Information:
8 samples were analyzed for Pace SOP. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 431418

N2: The lab does not hold TNI accreditation for this parameter.

- BLANK (Lab ID: 2346535)
  - Chromium, Hexavalent
- Dup-2 (Lab ID: 10359540008)
  - Chromium, Hexavalent
- EW-12 (Lab ID: 10359540004)
  - Chromium, Hexavalent
- EW-15 (Lab ID: 10359540003)
  - Chromium, Hexavalent
- EW-16 (Lab ID: 10359540001)
  - Chromium, Hexavalent
- EW-18 (Lab ID: 10359540002)
  - Chromium, Hexavalent
- EW-3B (Lab ID: 10359540007)
  - Chromium, Hexavalent

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PROJECT NARRATIVE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Method: **Pace SOP**
Description: LC-ICPMS Speciated Chromium
Client: AECOM MN ND
Date: August 22, 2016

Analyte Comments:

QC Batch: 431418

N2: The lab does not hold TNI accreditation for this parameter.

- EW-4 (Lab ID: 10359540006)
  - Chromium, Hexavalent
- FB-1 (Lab ID: 10359540005)
  - Chromium, Hexavalent
- LCS (Lab ID: 2346536)
  - Chromium, Hexavalent
- MS (Lab ID: 2346538)
  - Chromium, Hexavalent
- MSD (Lab ID: 2346539)
  - Chromium, Hexavalent

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Sample: EW-16 **Lab ID: 10359540001** Collected: 08/18/16 08:25 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**0.12J**	ug/L	0.50	0.014	1		08/18/16 18:51		N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Sample: EW-18 **Lab ID: 10359540002** Collected: 08/18/16 09:21 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**<0.014**	ug/L	0.50	0.014	1		08/18/16 18:55		N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Sample: EW-15 **Lab ID: 10359540003** Collected: 08/18/16 10:10 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**0.91**	ug/L	0.50	0.014	1		08/18/16 19:00		N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Sample: EW-12 **Lab ID: 10359540004** Collected: 08/18/16 12:34 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**0.32J**	ug/L	0.50	0.014	1		08/18/16 19:04		N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Sample: FB-1 **Lab ID: 10359540005** Collected: 08/18/16 13:30 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**<0.014**	ug/L	0.50	0.014	1		08/18/16 19:23		N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Sample: EW-4 **Lab ID: 10359540006** Collected: 08/18/16 13:50 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**8.9**	ug/L	2.5	0.072	5		08/18/16 20:04		N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Sample: EW-3B **Lab ID: 10359540007** Collected: 08/18/16 14:26 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**<0.014**	ug/L	0.50	0.014	1		08/18/16 20:18		N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Sample: Dup-2 **Lab ID: 10359540008** Collected: 08/18/16 00:00 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**<0.014**	ug/L	0.50	0.014	1		08/18/16 20:23		N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

QC Batch: 431418 Analysis Method: Pace SOP
QC Batch Method: Pace SOP Analysis Description: LC-ICPMS Speciation
Associated Lab Samples: 10359540001, 10359540002, 10359540003, 10359540004, 10359540005, 10359540006, 10359540007, 10359540008

METHOD BLANK: 2346535 Matrix: Water
Associated Lab Samples: 10359540001, 10359540002, 10359540003, 10359540004, 10359540005, 10359540006, 10359540007, 10359540008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chromium, Hexavalent	ug/L	<0.014	0.50	0.014	08/18/16 19:41	N2

LABORATORY CONTROL SAMPLE: 2346536

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	ug/L	.5	0.49J	97	80-120	N2

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2346538 2346539

Parameter	Units	10359540001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Hexavalent	ug/L	0.12J	.5	.5	0.53	0.54	83	85	75-125	1	20	N2

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

N2	The lab does not hold TNI accreditation for this parameter.

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359540

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10359540001	**EW-16**	Pace SOP	431418		
10359540002	**EW-18**	Pace SOP	431418		
10359540003	**EW-15**	Pace SOP	431418		
10359540004	**EW-12**	Pace SOP	431418		
10359540005	**FB-1**	Pace SOP	431418		
10359540006	**EW-4**	Pace SOP	431418		
10359540007	**EW-3B**	Pace SOP	431418		
10359540008	**Dup-2**	Pace SOP	431418		

Pace Analytical®
www.pacelabs.com

Separate report.

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Hex Chrome

L 0359540

Page: 1 of 1

1824828

Section A Required Client Information:

Company:	AECOM
Address:	800 LaSalle Ave. Suite 500
	Minneapolis, MN 55402
Email To:	andrew.tarara@aecom.com
Phone:	612-376-2000
Fax:	-
Requested Due Date/TAT:	Std

Section B Required Project Information:

Report To:	Drew Tarara
Copy To:	
Purchase Order No.:	
Project Name:	M+O Semi-Annual
Project Number:	60436248

Section C Invoice Information:

Attention:	Same.
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Carol Davy
Pace Profile #:	27489 #1

REGULATORY AGENCY

- [ ] NPDES
- [ ] GROUND WATER
- [ ] DRINKING WATER
- [ ] UST
- [ ] RCRA
- [ ] OTHER ______

Site Location STATE: ______

Section D Required Client Information

Matrix Codes MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	Composite Start DATE	Composite Start TIME	Composite End/Grab DATE	Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Speciated Hex Chrome	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	~~MW-17B~~ EW-16					8-18-16	0825		1	1									X		001
2	EW-18					|	0921		1	1									X		002
3	EW-15					|	1010		3	3									X		003
4	EW-12					|	1234		1	1									X		004
5	FB-1					|	1330		1	1									X		005
6	EW-4					|	1350		1	1									X		006
7	EW-3B					|	1426		1	1									X		007
8	Dup-2					|	—		1	1									X		008
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
① Run MS/MSD on EW-15	Ben Klaus / AECOM	8-18-16	1700	[signature]	8/18/16	1700	5.6	Y	N	Y
② all Hex Chrome samples were field filtered	[signature]	8/18/16	1730	[signature] Pace	8/18/16	17:30		Y		
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ben Klaus

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 8-18-16

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Accom

Project #: WO# : 10359540

10359540

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace ☐ SpeeDee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No **Optional:** Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☐ 151401163 ☑ 151401164 ☐ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 5.6, 4.9, 5.0, 4.2, 4.4 **Cooler Temp Corrected (°C):** 5.6, 4.9, 5.0, 4.4, 4.2 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** True **Date and Initials of Person Examining Contents:** CAT 8.18.16

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☑ Yes	☐ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: Carol Doug **Date:** 8/19/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

Report Prepared for:

Andrew Tarara
AECOM
800 LaSalle Avenue, Suite 500
Minneapolis MN 55402

REPORT OF LABORATORY ANALYSIS FOR PCDD/PCDF

Report Information:

Pace Project #: 10359545
Sample Receipt Date: 08/18/2016
Client Project #: 60436248
Client Sub PO #: 3000015961
State Cert #: 027-053-137

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

This report has been reviewed by:

September 01, 2016

Scott Unze, Project Manager
(612) 607-6383
(612) 607-6444 (fax)
scott.unze@pacelabs.com

Report Prepared Date:
September 1, 2016

Report of Laboratory Analysis

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

DISCUSSION

This report presents the results from the analyses performed on two samples submitted by a representative of AECOM. The samples were analyzed for the presence or absence of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using USEPA Method 1613B. The reporting limits were based on signal-to-noise measurements. Estimated Maximum Possible Concentration (EMPC) values were treated as positives in the toxic equivalence calculations.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extracts ranged from 54-105%. All of the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1613B. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for variation in recovery and accurate values were obtained.

Values were flagged "I" where incorrect isotope ratios were obtained or "P" where polychlorinated diphenyl ethers were present. Concentrations below the calibration range were flagged "J" and should be regarded as estimates.

A laboratory method blank was prepared and analyzed with each sample batch as part of our routine quality control procedures. The results show that PCDDs and PCDFs were not detected.

Laboratory spike samples were also prepared with the sample batch using clean water that had been fortified with native standard materials. The results show that the spiked native compounds were recovered at 80-127% with relative percent differences of 0.9-14.3%. These results were within the target ranges for the method. Matrix spikes were not prepared with the sample batch.

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE	MN002
California	01155CA	New York (NEL	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

REPORT OF LABORATORY ANALYSIS

Report No.....10359402

Appendix A

Sample Management

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Pace Analytical®
www.pacelabs.com

10359545

Page: 1 of 2

1824825

Section A Required Client Information:
Company: AECOM
Address: 250 LaSalle Ave. Suite 500 Minneapolis MN 55402
Email To: andrew.tararaceem.com
Phone: 612-376-2000 Fax:
Requested Due Date/TAT: std

Section B Required Project Information:
Report To: Drew Tarara
Copy To:
Purchase Order No.:
Project Name: M-6 Semi-Annual
Project Number: 60436048

Section C Invoice Information:
Attention: same.
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #: 27489 A1

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER
Site Location STATE:

Section D Required Client Information

Matrix Codes (MATRIX / CODE)
Drinking Water DW
Water WT
Waste Water WW
Product P
Soil/Solid SL
Oil OL
Wipe WP
Air AR
Tissue TS
Other OT

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Requested Analysis Filtered (Y/N): RCI by 8270D SIM	As by 6020A	Mn by 6020A	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-17B					8-17-16	1705		4	4									X		X		CC1
2	MW-3W					1	1601		2	2											X		CW2
3	EW-16					8-18-16	0825		3	2		1							X	X			
4	MW-105					8	1101		2	2									X				
5	EW-18						0921		3	2		1							X	X			
6	MW-104						1144		2	2									X				
7	EW-15						1010		9	6		3							X	X			
8	EW-12						1236		3	2		1							X	X			
9	FB-1						1330		3	2		1							X	X			
10	EW-4						1350		3	2		1							X	X			
11	EW-3B						1426		3	2		1							X	X			
12	MW-121						1514		3	2		1							X	X			

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
Run MS/MSD on EW-15	Ben Maus / AECOM	8-18-16	1700		8/18/16	1700	4.9	Y	N	Y
All arsenic samples were filtered.		8/18/16	1730	Pace	8/18/16	1730	5.0	Y	N	Y
							4.4	Y	N	Y
							4.2	Y	N	Y

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Ben Maus
SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY): 8-18-16

ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Page 6 of 14

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Accom

Project #: WO# : 10359545

10359545

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace ☐ SpeeDee ☐ Other:_____

Tracking Number: _____

Custody Seal on Cooler/Box Present? ☐ Yes ☒ No **Seals Intact?** ☐ Yes ☒ No **Optional:** Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other:_____ **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☐ 151401163 ☐ B88A912167504 ☑ 151401164 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 5.6, 4.9, 5.0, 4.4a, 4.4 **Cooler Temp Corrected (°C):** 5.6, 4.9, 5.0, 4.4, 4.2 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Correction Factor:** True **Date and Initials of Person Examining Contents:** CLT 8.18.16

USDA Regulated Soil (☒ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests? C.W 8.18.16	☑ Yes	☐ No	☒ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # 11/11
~~Exceptions: VOA, Coliform, TOC, Oil and Grease,~~ DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	~~Initial when~~ completed: _____ ~~Lot # of added~~ preservative: _____
~~Headspace in VOA Vials (>6mm)?~~	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: _____ **Date:** 08/19/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Reporting Flags

A = Reporting Limit based on signal to noise

B = Less than 10x higher than method blank level

C = Result obtained from confirmation analysis

D = Result obtained from analysis of diluted sample

E = Exceeds calibration range

I = Interference present

J = Estimated value

Nn = Value obtained from additional analysis

P = PCDE Interference

R = Recovery outside target range

S = Peak saturated

U = Analyte not detected

V = Result verified by confirmation analysis

X = %D Exceeds limits

Y = Calculated using average of daily RFs

* = See Discussion

Appendix B

Sample Analysis Summary

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Sample Analysis Results

Client - AECOM

Client's Sample ID	MW-17B		
Lab Sample ID	10359545001		
Filename	F160829B_13		
Injected By	BAL		
Total Amount Extracted	968 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	08/17/2016 17:05
ICAL ID	F160825	Received	08/18/2016 17:30
CCal Filename(s)	F160829A_18	Extracted	08/26/2016 13:30
Method Blank ID	BLANK-51705	Analyzed	08/30/2016 09:36

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.52		2,3,7,8-TCDF-13C	2.00	73
Total TCDF	ND	-----	0.52		2,3,7,8-TCDD-13C	2.00	90
					1,2,3,7,8-PeCDF-13C	2.00	83
2,3,7,8-TCDD	ND	-----	0.56		2,3,4,7,8-PeCDF-13C	2.00	78
Total TCDD	ND	-----	0.56		1,2,3,7,8-PeCDD-13C	2.00	91
					1,2,3,4,7,8-HxCDF-13C	2.00	67
1,2,3,7,8-PeCDF	ND	-----	0.53		1,2,3,6,7,8-HxCDF-13C	2.00	74
2,3,4,7,8-PeCDF	ND	-----	0.29		2,3,4,6,7,8-HxCDF-13C	2.00	73
Total PeCDF	2.80	-----	0.41	J	1,2,3,7,8,9-HxCDF-13C	2.00	76
					1,2,3,4,7,8-HxCDD-13C	2.00	65
1,2,3,7,8-PeCDD	ND	-----	0.28		1,2,3,6,7,8-HxCDD-13C	2.00	70
Total PeCDD	ND	-----	0.28		1,2,3,4,6,7,8-HpCDF-13C	2.00	67
					1,2,3,4,7,8,9-HpCDF-13C	2.00	70
1,2,3,4,7,8-HxCDF	0.83	-----	0.42	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	78
1,2,3,6,7,8-HxCDF	0.66	-----	0.23	J	OCDD-13C	4.00	56
2,3,4,6,7,8-HxCDF	-----	0.74	0.24	IJ			
1,2,3,7,8,9-HxCDF	ND	-----	0.29		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	18.00	-----	0.29	J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	-----	0.34	0.19	IJ	2,3,7,8-TCDD-37Cl4	0.20	88
1,2,3,6,7,8-HxCDD	1.60	-----	0.19	J			
1,2,3,7,8,9-HxCDD	-----	0.51	0.17	IJ			
Total HxCDD	3.00	-----	0.18	J			
1,2,3,4,6,7,8-HpCDF	23.00	-----	0.44	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	-----	1.20	0.51	IJ	Equivalence: 1.2 pg/L		
Total HpCDF	75.00	-----	0.48		(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	32.00	-----	0.54	J			
Total HpCDD	58.00	-----	0.54				
OCDF	100.00	-----	0.42	J			
OCDD	320.00	-----	0.71				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
EDL = Estimated Detection Limit

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

J = Estimated value
I = Interference present

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Sample Analysis Results

Client - AECOM

Client's Sample ID	MW-3W		
Lab Sample ID	10359545002		
Filename	F160829B_14		
Injected By	BAL		
Total Amount Extracted	917 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	08/17/2016 16:01
ICAL ID	F160825	Received	08/18/2016 17:30
CCal Filename(s)	F160829A_18	Extracted	08/26/2016 13:30
Method Blank ID	BLANK-51705	Analyzed	08/30/2016 10:26

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	2.6	-----	0.61	J	2,3,7,8-TCDF-13C	2.00	82
Total TCDF	9.3	-----	0.61	J	2,3,7,8-TCDD-13C	2.00	105
					1,2,3,7,8-PeCDF-13C	2.00	87
2,3,7,8-TCDD	1.0	-----	0.63	J	2,3,4,7,8-PeCDF-13C	2.00	82
Total TCDD	22.0	-----	0.63		1,2,3,7,8-PeCDD-13C	2.00	97
					1,2,3,4,7,8-HxCDF-13C	2.00	71
1,2,3,7,8-PeCDF	6.2	-----	0.47	J	1,2,3,6,7,8-HxCDF-13C	2.00	75
2,3,4,7,8-PeCDF	18.0	-----	0.42	J	2,3,4,6,7,8-HxCDF-13C	2.00	77
Total PeCDF	150.0	-----	0.45		1,2,3,7,8,9-HxCDF-13C	2.00	54
					1,2,3,4,7,8-HxCDD-13C	2.00	73
1,2,3,7,8-PeCDD	5.4	-----	0.29	J	1,2,3,6,7,8-HxCDD-13C	2.00	76
Total PeCDD	74.0	-----	0.29		1,2,3,4,6,7,8-HpCDF-13C	2.00	66
					1,2,3,4,7,8,9-HpCDF-13C	2.00	70
1,2,3,4,7,8-HxCDF	-----	120	0.76	P	1,2,3,4,6,7,8-HpCDD-13C	2.00	80
1,2,3,6,7,8-HxCDF	15.0	-----	1.10	J	OCDD-13C	4.00	65
2,3,4,6,7,8-HxCDF	24.0	-----	1.40	J			
1,2,3,7,8,9-HxCDF	15.0	-----	1.70	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	1700.0	-----	1.20		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	23.0	-----	2.10	J	2,3,7,8-TCDD-37Cl4	0.20	95
1,2,3,6,7,8-HxCDD	110.0	-----	1.60				
1,2,3,7,8,9-HxCDD	30.0	-----	2.10	J			
Total HxCDD	1000.0	-----	1.90				
1,2,3,4,6,7,8-HpCDF	1300.0	-----	1.60		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	74.0	-----	1.70		Equivalence: 110 pg/L		
Total HpCDF	6200.0	-----	1.70		(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	3800.0	-----	0.38				
Total HpCDD	14000.0	-----	0.38				
OCDF	5400.0	-----	0.50				
OCDD	36000.0	-----	0.70				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
EDL = Estimated Detection Limit

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

J = Estimated value
P = PCDE Interference

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Blank Analysis Results

Lab Sample ID	BLANK-51705	Matrix	Water
Filename	Y160829B_04	Dilution	NA
Total Amount Extracted	1030 mL	Extracted	08/26/2016 13:30
ICAL ID	Y160816A	Analyzed	08/30/2016 04:21
CCal Filename(s)	Y160829A_17	Injected By	SMT

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	1.30	2,3,7,8-TCDF-13C	2.00	70
Total TCDF	ND	-----	1.30	2,3,7,8-TCDD-13C	2.00	83
				1,2,3,7,8-PeCDF-13C	2.00	69
2,3,7,8-TCDD	ND	-----	0.61	2,3,4,7,8-PeCDF-13C	2.00	65
Total TCDD	ND	-----	0.61	1,2,3,7,8-PeCDD-13C	2.00	75
				1,2,3,4,7,8-HxCDF-13C	2.00	76
1,2,3,7,8-PeCDF	ND	-----	0.88	1,2,3,6,7,8-HxCDF-13C	2.00	77
2,3,4,7,8-PeCDF	ND	-----	0.73	2,3,4,6,7,8-HxCDF-13C	2.00	78
Total PeCDF	ND	-----	0.80	1,2,3,7,8,9-HxCDF-13C	2.00	83
				1,2,3,4,7,8-HxCDD-13C	2.00	77
1,2,3,7,8-PeCDD	ND	-----	1.50	1,2,3,6,7,8-HxCDD-13C	2.00	70
Total PeCDD	ND	-----	1.50	1,2,3,4,6,7,8-HpCDF-13C	2.00	79
				1,2,3,4,7,8,9-HpCDF-13C	2.00	82
1,2,3,4,7,8-HxCDF	ND	-----	0.59	1,2,3,4,6,7,8-HpCDD-13C	2.00	86
1,2,3,6,7,8-HxCDF	ND	-----	0.60	OCDD-13C	4.00	74
2,3,4,6,7,8-HxCDF	ND	-----	0.78			
1,2,3,7,8,9-HxCDF	ND	-----	1.10	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	-----	0.76	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	1.60	2,3,7,8-TCDD-37Cl4	0.20	82
1,2,3,6,7,8-HxCDD	ND	-----	1.60			
1,2,3,7,8,9-HxCDD	ND	-----	1.60			
Total HxCDD	ND	-----	1.60			
1,2,3,4,6,7,8-HpCDF	ND	-----	1.10	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	2.00	Equivalence: 0.00 pg/L		
Total HpCDF	ND	-----	1.50	(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	ND	-----	2.00			
Total HpCDD	ND	-----	2.00			
OCDF	ND	-----	1.60			
OCDD	ND	-----	4.50			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
EDL = Estimated Detection Limit

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-51706		
Filename	Y160829B_01	Matrix	Water
Total Amount Extracted	1030 mL	Dilution	NA
ICAL ID	Y160816A	Extracted	08/26/2016 13:30
CCal Filename	Y160829A_17	Analyzed	08/30/2016 02:12
Method Blank ID	BLANK-51705	Injected By	SMT

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	11	7.5	15.8	107
2,3,7,8-TCDD	10	8.0	6.7	15.8	80
1,2,3,7,8-PeCDF	50	53	40.0	67.0	106
2,3,4,7,8-PeCDF	50	54	34.0	80.0	107
1,2,3,7,8-PeCDD	50	47	35.0	71.0	95
1,2,3,4,7,8-HxCDF	50	53	36.0	67.0	106
1,2,3,6,7,8-HxCDF	50	53	42.0	65.0	106
2,3,4,6,7,8-HxCDF	50	49	35.0	78.0	98
1,2,3,7,8,9-HxCDF	50	47	39.0	65.0	94
1,2,3,4,7,8-HxCDD	50	55	35.0	82.0	109
1,2,3,6,7,8-HxCDD	50	55	38.0	67.0	110
1,2,3,7,8,9-HxCDD	50	56	32.0	81.0	112
1,2,3,4,6,7,8-HpCDF	50	53	41.0	61.0	105
1,2,3,4,7,8,9-HpCDF	50	48	39.0	69.0	96
1,2,3,4,6,7,8-HpCDD	50	49	35.0	70.0	97
OCDF	100	100	63.0	170.0	103
OCDD	100	100	78.0	144.0	101
2,3,7,8-TCDD-37Cl4	10	8.6	3.1	19.1	86
2,3,7,8-TCDF-13C	100	72	22.0	152.0	72
2,3,7,8-TCDD-13C	100	87	20.0	175.0	87
1,2,3,7,8-PeCDF-13C	100	72	21.0	192.0	72
2,3,4,7,8-PeCDF-13C	100	66	13.0	328.0	66
1,2,3,7,8-PeCDD-13C	100	74	21.0	227.0	74
1,2,3,4,7,8-HxCDF-13C	100	75	19.0	202.0	75
1,2,3,6,7,8-HxCDF-13C	100	75	21.0	159.0	75
2,3,4,6,7,8-HxCDF-13C	100	77	22.0	176.0	77
1,2,3,7,8,9-HxCDF-13C	100	81	17.0	205.0	81
1,2,3,4,7,8-HxCDD-13C	100	73	21.0	193.0	73
1,2,3,6,7,8-HxCDD-13C	100	70	25.0	163.0	70
1,2,3,4,6,7,8-HpCDF-13C	100	75	21.0	158.0	75
1,2,3,4,7,8,9-HpCDF-13C	100	72	20.0	186.0	72
1,2,3,4,6,7,8-HpCDD-13C	100	78	26.0	166.0	78
OCDD-13C	200	110	26.0	397.0	56

Cs = Concentration Spiked (ng/mL)
Cr = Concentration Recovered (ng/mL)
Rec. = Recovery (Expressed as Percent)
Control Limit Reference: Method 1613, Table 6, 10/94 Revision
R = Recovery outside of control limits
Nn = Value obtained from additional analysis
* = See Discussion

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCSD-51707		
Filename	Y160829B_02	Matrix	Water
Total Amount Extracted	1060 mL	Dilution	NA
ICAL ID	Y160816A	Extracted	08/26/2016 13:30
CCal Filename	Y160829A_17	Analyzed	08/30/2016 02:55
Method Blank ID	BLANK-51705	Injected By	SMT

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	11	7.5	15.8	113
2,3,7,8-TCDD	10	8.5	6.7	15.8	85
1,2,3,7,8-PeCDF	50	56	40.0	67.0	112
2,3,4,7,8-PeCDF	50	56	34.0	80.0	113
1,2,3,7,8-PeCDD	50	49	35.0	71.0	97
1,2,3,4,7,8-HxCDF	50	53	36.0	67.0	107
1,2,3,6,7,8-HxCDF	50	55	42.0	65.0	110
2,3,4,6,7,8-HxCDF	50	51	35.0	78.0	102
1,2,3,7,8,9-HxCDF	50	47	39.0	65.0	93
1,2,3,4,7,8-HxCDD	50	49	35.0	82.0	99
1,2,3,6,7,8-HxCDD	50	64	38.0	67.0	127
1,2,3,7,8,9-HxCDD	50	60	32.0	81.0	121
1,2,3,4,6,7,8-HpCDF	50	56	41.0	61.0	111
1,2,3,4,7,8,9-HpCDF	50	51	39.0	69.0	102
1,2,3,4,6,7,8-HpCDD	50	50	35.0	70.0	100
OCDF	100	110	63.0	170.0	109
OCDD	100	110	78.0	144.0	109
2,3,7,8-TCDD-37Cl4	10	8.9	3.1	19.1	89
2,3,7,8-TCDF-13C	100	74	22.0	152.0	74
2,3,7,8-TCDD-13C	100	87	20.0	175.0	87
1,2,3,7,8-PeCDF-13C	100	74	21.0	192.0	74
2,3,4,7,8-PeCDF-13C	100	69	13.0	328.0	69
1,2,3,7,8-PeCDD-13C	100	81	21.0	227.0	81
1,2,3,4,7,8-HxCDF-13C	100	74	19.0	202.0	74
1,2,3,6,7,8-HxCDF-13C	100	76	21.0	159.0	76
2,3,4,6,7,8-HxCDF-13C	100	77	22.0	176.0	77
1,2,3,7,8,9-HxCDF-13C	100	80	17.0	205.0	80
1,2,3,4,7,8-HxCDD-13C	100	77	21.0	193.0	77
1,2,3,6,7,8-HxCDD-13C	100	66	25.0	163.0	66
1,2,3,4,6,7,8-HpCDF-13C	100	75	21.0	158.0	75
1,2,3,4,7,8,9-HpCDF-13C	100	73	20.0	186.0	73
1,2,3,4,6,7,8-HpCDD-13C	100	84	26.0	166.0	84
OCDD-13C	200	120	26.0	397.0	60

Cs = Concentration Spiked (ng/mL)
Cr = Concentration Recovered (ng/mL)
Rec. = Recovery (Expressed as Percent)
Control Limit Reference: Method 1613, Table 6, 10/94 Revision
R = Recovery outside of control limits
Nn = Value obtained from additional analysis
* = See Discussion

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B

Spike Recovery Relative Percent Difference (RPD) Results

Client	AECOM		
Spike 1 ID	LCS-51706	Spike 2 ID	LCSD-51707
Spike 1 Filename	Y160829B_01	Spike 2 Filename	Y160829B_02

Compound	Spike 1 %REC	Spike 2 %REC	%RPD
2,3,7,8-TCDF	107	113	5.5
2,3,7,8-TCDD	80	85	6.1
1,2,3,7,8-PeCDF	106	112	5.5
2,3,4,7,8-PeCDF	107	113	5.5
1,2,3,7,8-PeCDD	95	97	2.1
1,2,3,4,7,8-HxCDF	106	107	0.9
1,2,3,6,7,8-HxCDF	106	110	3.7
2,3,4,6,7,8-HxCDF	98	102	4.0
1,2,3,7,8,9-HxCDF	94	93	1.1
1,2,3,4,7,8-HxCDD	109	99	9.6
1,2,3,6,7,8-HxCDD	110	127	14.3
1,2,3,7,8,9-HxCDD	112	121	7.7
1,2,3,4,6,7,8-HpCDF	105	111	5.6
1,2,3,4,7,8,9-HpCDF	96	102	6.1
1,2,3,4,6,7,8-HpCDD	97	100	3.0
OCDF	103	109	5.7
OCDD	101	109	7.6

%REC = Percent Recovered
RPD = The difference between the two values divided by the mean value

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

August 30, 2016

Andrew Tarara
AECOM
800 LaSalle Avenue, Suite 500
Minneapolis, MN 55402

RE: Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Dear Andrew Tarara:
Enclosed are the analytical results for sample(s) received by the laboratory on August 18, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
525 N 8th Street, Salina, KS 67401
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10359548001	**MW-17B**	Water	08/17/16 17:05	08/18/16 17:30
10359548002	**EW-16**	Water	08/18/16 08:25	08/18/16 17:30
10359548003	**MW-105**	Water	08/18/16 11:01	08/18/16 17:30
10359548004	**EW-18**	Water	08/18/16 09:21	08/18/16 17:30
10359548005	**MW-104**	Water	08/18/16 11:44	08/18/16 17:30
10359548006	**EW-15**	Water	08/18/16 10:10	08/18/16 17:30
10359548007	**EW-12**	Water	08/18/16 12:34	08/18/16 17:30
10359548008	**FB-1**	Water	08/18/16 13:30	08/18/16 17:30
10359548009	**EW-4**	Water	08/18/16 13:50	08/18/16 17:30
10359548010	**EW-3B**	Water	08/18/16 14:26	08/18/16 17:30
10359548011	**MW-121**	Water	08/18/16 15:14	08/18/16 17:30
10359548012	**MW-119**	Water	08/18/16 15:52	08/18/16 17:30
10359548013	**MW-117**	Water	08/18/16 16:18	08/18/16 17:30
10359548014	**DUP-2**	Water	08/18/16 00:00	08/18/16 17:30
10359548015	**DUP-3**	Water	08/18/16 00:00	08/18/16 17:30
10359548016	**DUP-4**	Water	08/18/16 00:00	08/18/16 17:30

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SAMPLE ANALYTE COUNT

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10359548001	**MW-17B**	EPA 8270D by SIM	JLR	2	PASI-M
10359548002	**EW-16**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359548003	**MW-105**	EPA 8270D by SIM	JLR	2	PASI-M
10359548004	**EW-18**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359548005	**MW-104**	EPA 8270D by SIM	JLR	2	PASI-M
10359548006	**EW-15**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359548007	**EW-12**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359548008	**FB-1**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359548009	**EW-4**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359548010	**EW-3B**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359548011	**MW-121**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359548012	**MW-119**	EPA 8270D by SIM	JLR	2	PASI-M
10359548013	**MW-117**	EPA 8270D by SIM	JLR	2	PASI-M
10359548014	**DUP-2**	EPA 6020A	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10359548015	**DUP-3**	EPA 8270D by SIM	JLR	2	PASI-M
10359548016	**DUP-4**	EPA 8270D by SIM	JLR	2	PASI-M

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SUMMARY OF DETECTION

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
10359548001	**MW-17B**					
EPA 8270D by SIM	Pentachlorophenol	728	ug/L	63.2	08/27/16 17:50	
10359548002	**EW-16**					
EPA 6020A	Arsenic, Dissolved	0.98	ug/L	0.50	08/24/16 23:45	
10359548003	**MW-105**					
EPA 8270D by SIM	Pentachlorophenol	11.7	ug/L	1.3	08/29/16 23:04	
10359548004	**EW-18**					
EPA 6020A	Arsenic, Dissolved	0.82	ug/L	0.50	08/24/16 23:48	
10359548005	**MW-104**					
EPA 8270D by SIM	Pentachlorophenol	1.3	ug/L	0.62	08/29/16 17:36	
10359548006	**EW-15**					
EPA 6020A	Arsenic, Dissolved	0.53	ug/L	0.50	08/24/16 23:51	
10359548007	**EW-12**					
EPA 6020A	Arsenic, Dissolved	0.30J	ug/L	0.50	08/25/16 00:05	
EPA 8270D by SIM	Pentachlorophenol	5.8	ug/L	0.63	08/29/16 18:58	
10359548008	**FB-1**					
EPA 8270D by SIM	Pentachlorophenol	1.3	ug/L	0.67	08/29/16 19:19	
10359548009	**EW-4**					
EPA 6020A	Arsenic, Dissolved	0.60	ug/L	0.50	08/25/16 00:16	
EPA 8270D by SIM	Pentachlorophenol	3.2	ug/L	0.62	08/29/16 19:39	
10359548010	**EW-3B**					
EPA 6020A	Arsenic, Dissolved	7.9	ug/L	0.50	08/25/16 00:19	
10359548011	**MW-121**					
EPA 6020A	Arsenic, Dissolved	0.49J	ug/L	0.50	08/25/16 00:22	
10359548014	**DUP-2**					
EPA 6020A	Arsenic, Dissolved	7.8	ug/L	0.50	08/25/16 00:25	
10359548015	**DUP-3**					
EPA 8270D by SIM	Pentachlorophenol	18.4	ug/L	3.1	08/29/16 23:25	
10359548016	**DUP-4**					
EPA 8270D by SIM	Pentachlorophenol	707	ug/L	61.9	08/29/16 21:42	

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Method: **EPA 6020A**
Description: 6020A MET ICPMS, Dissolved
Client: AECOM MN ND
Date: August 30, 2016

General Information:
9 samples were analyzed for EPA 6020A. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3020 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Method: **EPA 8270D by SIM**
Description: 8270D MSSV PCP by SIM
Client: AECOM MN ND
Date: August 30, 2016

General Information:
16 samples were analyzed for EPA 8270D by SIM. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3510C with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

QC Batch: 432155

S4: Surrogate recovery not evaluated against control limits due to sample dilution.

- DUP-4 (Lab ID: 10359548016)
  - 2,4,6-Tribromophenol (S)
- MW-17B (Lab ID: 10359548001)
  - 2,4,6-Tribromophenol (S)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: MW-17B **Lab ID: 10359548001** Collected: 08/17/16 17:05 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**728**	ug/L	63.2	29.8	100	08/24/16 08:12	08/27/16 17:50	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	0	%.	46-125		100	08/24/16 08:12	08/27/16 17:50	118-79-6	S4

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: EW-16 **Lab ID: 10359548002** Collected: 08/18/16 08:25 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.98**	ug/L	0.50	0.091	1	08/24/16 11:04	08/24/16 23:45	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	08/24/16 08:12	08/29/16 16:55	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	83	%.	46-125		1	08/24/16 08:12	08/29/16 16:55	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: MW-105 **Lab ID: 10359548003** Collected: 08/18/16 11:01 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**11.7**	ug/L	1.3	0.59	2	08/24/16 08:12	08/29/16 23:04	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	98	%.	46-125		2	08/24/16 08:12	08/29/16 23:04	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: EW-18 **Lab ID: 10359548004** Collected: 08/18/16 09:21 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.82**	ug/L	0.50	0.091	1	08/24/16 11:04	08/24/16 23:48	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	08/24/16 08:12	08/29/16 17:15	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	78	%.	46-125		1	08/24/16 08:12	08/29/16 17:15	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: MW-104 **Lab ID: 10359548005** Collected: 08/18/16 11:44 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**1.3**	ug/L	0.62	0.29	1	08/24/16 08:12	08/29/16 17:36	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	81	%.	46-125		1	08/24/16 08:12	08/29/16 17:36	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: EW-15 **Lab ID: 10359548006** Collected: 08/18/16 10:10 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.53**	ug/L	0.50	0.091	1	08/24/16 11:04	08/24/16 23:51	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.64	0.30	1	08/24/16 08:12	08/29/16 17:57	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	77	%.	46-125		1	08/24/16 08:12	08/29/16 17:57	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: EW-12 **Lab ID: 10359548007** Collected: 08/18/16 12:34 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.30J**	ug/L	0.50	0.091	1	08/24/16 11:04	08/25/16 00:05	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**5.8**	ug/L	0.63	0.29	1	08/24/16 08:12	08/29/16 18:58	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	86	%.	46-125		1	08/24/16 08:12	08/29/16 18:58	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: FB-1 **Lab ID: 10359548008** Collected: 08/18/16 13:30 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**<0.091**	ug/L	0.50	0.091	1	08/24/16 11:04	08/25/16 00:08	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**1.3**	ug/L	0.67	0.31	1	08/24/16 08:12	08/29/16 19:19	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	86	%.	46-125		1	08/24/16 08:12	08/29/16 19:19	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: EW-4 **Lab ID: 10359548009** Collected: 08/18/16 13:50 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.60**	ug/L	0.50	0.091	1	08/24/16 11:04	08/25/16 00:16	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**3.2**	ug/L	0.62	0.29	1	08/24/16 08:12	08/29/16 19:39	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	80	%.	46-125		1	08/24/16 08:12	08/29/16 19:39	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: EW-3B **Lab ID: 10359548010** Collected: 08/18/16 14:26 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**7.9**	ug/L	0.50	0.091	1	08/24/16 11:04	08/25/16 00:19	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	08/24/16 08:12	08/29/16 20:00	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	77	%.	46-125		1	08/24/16 08:12	08/29/16 20:00	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: MW-121 **Lab ID: 10359548011** Collected: 08/18/16 15:14 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.49J**	ug/L	0.50	0.091	1	08/24/16 11:04	08/25/16 00:22	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.63	0.29	1	08/24/16 08:12	08/29/16 20:21	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	67	%.	46-125		1	08/24/16 08:12	08/29/16 20:21	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: MW-119 **Lab ID: 10359548012** Collected: 08/18/16 15:52 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.64	0.30	1	08/24/16 08:12	08/29/16 20:41	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	72	%.	46-125		1	08/24/16 08:12	08/29/16 20:41	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: MW-117 **Lab ID: 10359548013** Collected: 08/18/16 16:18 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.63	0.30	1	08/24/16 08:12	08/29/16 21:02	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	78	%.	46-125		1	08/24/16 08:12	08/29/16 21:02	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: DUP-2 **Lab ID: 10359548014** Collected: 08/18/16 00:00 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**7.8**	ug/L	0.50	0.091	1	08/24/16 11:04	08/25/16 00:25	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	08/24/16 08:12	08/29/16 21:22	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	82	%.	46-125		1	08/24/16 08:12	08/29/16 21:22	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: DUP-3 **Lab ID: 10359548015** Collected: 08/18/16 00:00 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**18.4**	ug/L	3.1	1.5	5	08/24/16 08:12	08/29/16 23:25	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	83	%.	46-125		5	08/24/16 08:12	08/29/16 23:25	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Sample: DUP-4 **Lab ID: 10359548016** Collected: 08/18/16 00:00 Received: 08/18/16 17:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**707**	ug/L	61.9	29.2	100	08/24/16 08:12	08/29/16 21:42	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	0	%.	46-125		100	08/24/16 08:12	08/29/16 21:42	118-79-6	S4

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

QC Batch: 431430 Analysis Method: EPA 6020A
QC Batch Method: EPA 3020 Analysis Description: 6020A Water Dissolved UPD4
Associated Lab Samples: 10359548002, 10359548004, 10359548006, 10359548007, 10359548008, 10359548009, 10359548010, 10359548011, 10359548014

METHOD BLANK: 2346674 Matrix: Water
Associated Lab Samples: 10359548002, 10359548004, 10359548006, 10359548007, 10359548008, 10359548009, 10359548010, 10359548011, 10359548014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	ug/L	<0.091	0.50	0.091	08/24/16 23:08	

LABORATORY CONTROL SAMPLE: 2346675

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	ug/L	100	103	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2346676 2346677

Parameter	Units	10359548006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	ug/L	0.53	100	100	103	108	102	108	75-125	5	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

QC Batch: 432155 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3510C Analysis Description: 8270D PCP MSSV
Associated Lab Samples: 10359548001, 10359548002, 10359548003, 10359548004, 10359548005, 10359548006, 10359548007, 10359548008, 10359548009, 10359548010, 10359548011, 10359548012, 10359548013, 10359548014, 10359548015, 10359548016

METHOD BLANK: 2350234 Matrix: Water
Associated Lab Samples: 10359548001, 10359548002, 10359548003, 10359548004, 10359548005, 10359548006, 10359548007, 10359548008, 10359548009, 10359548010, 10359548011, 10359548012, 10359548013, 10359548014, 10359548015, 10359548016

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Pentachlorophenol	ug/L	<0.28	0.60	0.28	08/27/16 17:09	
2,4,6-Tribromophenol (S)	%.	80	46-125		08/27/16 17:09	

LABORATORY CONTROL SAMPLE: 2350235

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Pentachlorophenol	ug/L	1	0.85	85	30-125	
2,4,6-Tribromophenol (S)	%.			87	46-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2350236 2350237

Parameter	Units	10359548006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Pentachlorophenol	ug/L	<0.30	1.1	1.1	0.72	0.54J	63	47	30-125		30	
2,4,6-Tribromophenol (S)	%.						89	77	46-125			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

S4	Surrogate recovery not evaluated against control limits due to sample dilution.

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359548

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10359548002	**EW-16**	EPA 3020	431430	EPA 6020A	432319
10359548004	**EW-18**	EPA 3020	431430	EPA 6020A	432319
10359548006	**EW-15**	EPA 3020	431430	EPA 6020A	432319
10359548007	**EW-12**	EPA 3020	431430	EPA 6020A	432319
10359548008	**FB-1**	EPA 3020	431430	EPA 6020A	432319
10359548009	**EW-4**	EPA 3020	431430	EPA 6020A	432319
10359548010	**EW-3B**	EPA 3020	431430	EPA 6020A	432319
10359548011	**MW-121**	EPA 3020	431430	EPA 6020A	432319
10359548014	**DUP-2**	EPA 3020	431430	EPA 6020A	432319
10359548001	**MW-17B**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548002	**EW-16**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548003	**MW-105**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548004	**EW-18**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548005	**MW-104**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548006	**EW-15**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548007	**EW-12**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548008	**FB-1**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548009	**EW-4**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548010	**EW-3B**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548011	**MW-121**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548012	**MW-119**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548013	**MW-117**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548014	**DUP-2**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548015	**DUP-3**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359548016	**DUP-4**	EPA 3510C	432155	EPA 8270D by SIM	432862

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www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10358548

Page: 1 of 2

1824825

Section A Required Client Information:

Company: AECOM
Address: 800 LaSalle Ave. Suite 500
Minneapolis MN 55402
Email To: andrew.tarara@aecom.com
Phone: 612-376-2000 Fax:
Requested Due Date/TAT: std

Section B Required Project Information:

Report To: Drew Tarara
Copy To:
Purchase Order No.:
Project Name: M-6 Semi-Annual
Project Number: 60436248

Section C Invoice Information:

Attention: same.
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Carol Dawy
Pace Profile #: 27489 A1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE:

Section D Required Client Information

Matrix Codes (MATRIX / CODE)

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	RCRA by 8260B	As by 6020A	Oregon by 1613	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-17B					8-17-16	1705		4	4									X		X		01
2	MW-3W					1	1601		2	2											X		02
3	EW-16					8-18-16	0825		3	2		1							X	X			03
4	MW-105					8	1101		2	2									X				04
5	EW-18						0921		3	2		1							X	X			05
6	MW-104						1144		2	2									X				06
7	EW-15						1010		9	6		3							X	X			07
8	EW-12						1234		3	2		1							X	X			08
9	FB-1						1330		3	2		1							X	X			09
10	EW-4						1350		3	2		1							X	X			10
11	EW-3B						1426		3	2		1							X	X			11
12	MW-121						1514		3	2		1							X	X			11

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
① Run MS/MSD on EW-15	Ben Klaus / AECOM	8-18-16	1700		8/18/16	1700	4.9	Y	N	Y
② All arsenic samples were field filtered.		8/18/16	1730	Pace	8/18/16	1730	5.0	Y	N	Y
							4.4	Y	N	Y
							4.2	Y	N	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Ben Klaus
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 8-18-16

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

1824826

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: AECOM	Report To: Drew Tarara	Attention: Same -
Address: 300 LaSalle Ave. Suite 500 Minneapolis, MN 55403	Copy To:	Company Name:
Email To: andrew.tarara@aecom.com	Purchase Order No.:	Address:
Phone: 612-376-2000 Fax:	Project Name: M+6 Semi-Annual	Pace Quote Reference:
Requested Due Date/TAT: Std	Project Number: 60436248	Pace Project Manager: Carol Davy
		Pace Profile #: 27489 #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: _____

Requested Analysis Filtered (Y/N)

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test ↓ Y/N	RCRA 8 by 6020B	As by 6020A	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-119					8-18-16	1552		2	2									X			012
2	MW-117						1618		2	2									X			013
3	Dup-2						-		3	2		1							X	X		014
4	Dup-3						-		2	2									X			015
5	Dup-4						-		2	2									X			016
6																						
7																						
8																						
9																						
10																						
11																						
12																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
(1) All not Arsenic Samples were filtered.	Ben Klaus / AECOM	8-18-16	1700		8/18/16	1700	
		8/19/16	1730				

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ben Klaus

SIGNATURE of SAMPLER: _____ DATE Signed (MM/DD/YY): 8-18-16

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Accom

Project #: WO# : 10359548

10359548

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace ☐ SpeeDee ☐ Other:_____

Tracking Number: _____

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other:_____ **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☐ 151401163 ☑ 151401164 ☐ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 5.6, 4.9, 5.0, 4.1, 4.2 **Cooler Temp Corrected (°C):** 5.6, 4.9, 5.0, 4.1, 4.2 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** True **Date and Initials of Person Examining Contents:** CW 8.18.16

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests? CW 8.18.16	☑ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # 11/11
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	Initial when completed:_____ Lot # of added preservative:_____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):_____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: _____ **Date:** 8/19/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

August 31, 2016

Andrew Tarara
AECOM
800 LaSalle Avenue, Suite 500
Minneapolis, MN 55402

RE: Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Dear Andrew Tarara:
Enclosed are the analytical results for sample(s) received by the laboratory on August 19, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
525 N 8th Street, Salina, KS 67401
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10359688001	**MW-24W**	Water	08/18/16 17:06	08/19/16 14:40
10359688002	**MW-26W**	Water	08/18/16 17:45	08/19/16 14:40
10359688003	**FB-2**	Water	08/19/16 08:00	08/19/16 14:40
10359688004	**MW-124**	Water	08/19/16 08:30	08/19/16 14:40
10359688005	**MW-23B**	Water	08/19/16 08:56	08/19/16 14:40
10359688006	**MW-103**	Water	08/19/16 09:54	08/19/16 14:40
10359688007	**MW-118**	Water	08/19/16 10:31	08/19/16 14:40
10359688008	**MW-108**	Water	08/19/16 11:14	08/19/16 14:40
10359688009	**MW-107**	Water	08/19/16 11:53	08/19/16 14:40
10359688010	**MW-106**	Water	08/19/16 12:22	08/19/16 14:40

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10359688001	**MW-24W**	EPA 8270D by SIM	JLR	2	PASI-M
10359688002	**MW-26W**	EPA 8270D by SIM	JLR	2	PASI-M
10359688003	**FB-2**	EPA 8270D by SIM	JLR	2	PASI-M
10359688004	**MW-124**	EPA 8270D by SIM	JLR	2	PASI-M
10359688005	**MW-23B**	EPA 8270D by SIM	JLR	2	PASI-M
10359688006	**MW-103**	EPA 8270D by SIM	JLR	2	PASI-M
10359688007	**MW-118**	EPA 8270D by SIM	JLR	2	PASI-M
10359688008	**MW-108**	EPA 8270D by SIM	JLR	2	PASI-M
10359688009	**MW-107**	EPA 8270D by SIM	JLR	2	PASI-M
10359688010	**MW-106**	EPA 8270D by SIM	JLR	2	PASI-M

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SUMMARY OF DETECTION

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
10359688001	**MW-24W**					
EPA 8270D by SIM	Pentachlorophenol	76.3	ug/L	6.2	08/29/16 23:45	
10359688007	**MW-118**					
EPA 8270D by SIM	Pentachlorophenol	34.8	ug/L	6.3	08/29/16 16:34	
10359688009	**MW-107**					
EPA 8270D by SIM	Pentachlorophenol	4.2	ug/L	0.63	08/29/16 15:53	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Date: August 31, 2016

Samples MW-24W and MW-26W were received out of temp.

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1700 Elm Street - Suite 200
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PROJECT NARRATIVE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Method: **EPA 8270D by SIM**
Description: 8270D MSSV PCP by SIM
Client: AECOM MN ND
Date: August 31, 2016

General Information:
10 samples were analyzed for EPA 8270D by SIM. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

H5: Reanalysis conducted in excess of EPA method holding time. Results confirm original analysis performed in hold time.
- MW-103 (Lab ID: 10359688006)

Sample Preparation:
The samples were prepared in accordance with EPA 3510C with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

QC Batch: 432441

S0: Surrogate recovery outside laboratory control limits.
- MW-103 (Lab ID: 10359688006)
  - 2,4,6-Tribromophenol (S)

S4: Surrogate recovery not evaluated against control limits due to sample dilution.
- MW-118 (Lab ID: 10359688007)
  - 2,4,6-Tribromophenol (S)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 432441

A matrix spike/matrix spike duplicate was not performed due to insufficient sample volume.

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PROJECT NARRATIVE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Method: **EPA 8270D by SIM**
Description: 8270D MSSV PCP by SIM
Client: AECOM MN ND
Date: August 31, 2016

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Sample: MW-24W **Lab ID: 10359688001** Collected: 08/18/16 17:06 Received: 08/19/16 14:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**76.3**	ug/L	6.2	2.9	10	08/24/16 08:12	08/29/16 23:45	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	92	%.	46-125		10	08/24/16 08:12	08/29/16 23:45	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Sample: MW-26W **Lab ID: 10359688002** Collected: 08/18/16 17:45 Received: 08/19/16 14:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	08/24/16 08:12	08/29/16 22:03	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	67	%.	46-125		1	08/24/16 08:12	08/29/16 22:03	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Sample: FB-2 **Lab ID: 10359688003** Collected: 08/19/16 08:00 Received: 08/19/16 14:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.35**	ug/L	0.73	0.35	1	08/24/16 08:12	08/29/16 22:23	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	86	%.	46-125		1	08/24/16 08:12	08/29/16 22:23	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Sample: MW-124 **Lab ID: 10359688004** Collected: 08/19/16 08:30 Received: 08/19/16 14:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.63	0.29	1	08/24/16 08:12	08/29/16 22:44	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	59	%.	46-125		1	08/24/16 08:12	08/29/16 22:44	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Sample: MW-23B **Lab ID: 10359688005** Collected: 08/19/16 08:56 Received: 08/19/16 14:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	08/25/16 08:20	08/29/16 14:52	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	71	%.	46-125		1	08/25/16 08:20	08/29/16 14:52	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Sample: MW-103 **Lab ID: 10359688006** Collected: 08/19/16 09:54 Received: 08/19/16 14:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	08/25/16 08:20	08/29/16 15:12	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	34	%.	46-125		1	08/25/16 08:20	08/29/16 15:12	118-79-6	H5,S0

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Sample: MW-118 **Lab ID: 10359688007** Collected: 08/19/16 10:31 Received: 08/19/16 14:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**34.8**	ug/L	6.3	2.9	10	08/25/16 08:20	08/29/16 16:34	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	0	%.	46-125		10	08/25/16 08:20	08/29/16 16:34	118-79-6	S4

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Sample: MW-108 **Lab ID: 10359688008** Collected: 08/19/16 11:14 Received: 08/19/16 14:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	08/25/16 08:20	08/29/16 15:33	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	81	%.	46-125		1	08/25/16 08:20	08/29/16 15:33	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Sample: MW-107 **Lab ID: 10359688009** Collected: 08/19/16 11:53 Received: 08/19/16 14:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**4.2**	ug/L	0.63	0.29	1	08/25/16 08:20	08/29/16 15:53	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	87	%.	46-125		1	08/25/16 08:20	08/29/16 15:53	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Sample: MW-106 **Lab ID: 10359688010** Collected: 08/19/16 12:22 Received: 08/19/16 14:40 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	08/25/16 08:20	08/29/16 16:14	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	86	%.	46-125		1	08/25/16 08:20	08/29/16 16:14	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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QUALITY CONTROL DATA

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

QC Batch: 432155 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3510C Analysis Description: 8270D PCP MSSV
Associated Lab Samples: 10359688001, 10359688002, 10359688003, 10359688004

METHOD BLANK: 2350234 Matrix: Water
Associated Lab Samples: 10359688001, 10359688002, 10359688003, 10359688004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Pentachlorophenol	ug/L	<0.28	0.60	0.28	08/27/16 17:09	
2,4,6-Tribromophenol (S)	%.	80	46-125		08/27/16 17:09	

LABORATORY CONTROL SAMPLE: 2350235

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Pentachlorophenol	ug/L	1	0.85	85	30-125	
2,4,6-Tribromophenol (S)	%.			87	46-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2350236 2350237

Parameter	Units	10359548006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Pentachlorophenol	ug/L	<0.30	1.1	1.1	0.72	0.54J	63	47	30-125		30	
2,4,6-Tribromophenol (S)	%.						89	77	46-125			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

QC Batch: 432441 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3510C Analysis Description: 8270D PCP MSSV
Associated Lab Samples: 10359688005, 10359688006, 10359688007, 10359688008, 10359688009, 10359688010

METHOD BLANK: 2351608 Matrix: Water
Associated Lab Samples: 10359688005, 10359688006, 10359688007, 10359688008, 10359688009, 10359688010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Pentachlorophenol	ug/L	<0.28	0.60	0.28	08/27/16 11:42	
2,4,6-Tribromophenol (S)	%.	86	46-125		08/27/16 11:42	

LABORATORY CONTROL SAMPLE & LCSD: 2351609 2351610

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Pentachlorophenol	ug/L	1	0.87	0.95	87	95	30-125	9	20	
2,4,6-Tribromophenol (S)	%.				92	97	46-125			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

WORKORDER QUALIFIERS

WO: 10359688

[1]	Samples MW-24W and MW-26W were received out of temp.

BATCH QUALIFIERS

Batch: 432861

[M5]	A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

ANALYTE QUALIFIERS

H5	Reanalysis conducted in excess of EPA method holding time. Results confirm original analysis performed in hold time.
S0	Surrogate recovery outside laboratory control limits.
S4	Surrogate recovery not evaluated against control limits due to sample dilution.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60436248 M&G Semi-Annual
Pace Project No.: 10359688

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10359688001	**MW-24W**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359688002	**MW-26W**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359688003	**FB-2**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359688004	**MW-124**	EPA 3510C	432155	EPA 8270D by SIM	432862
10359688005	**MW-23B**	EPA 3510C	432441	EPA 8270D by SIM	432861
10359688006	**MW-103**	EPA 3510C	432441	EPA 8270D by SIM	432861
10359688007	**MW-118**	EPA 3510C	432441	EPA 8270D by SIM	432861
10359688008	**MW-108**	EPA 3510C	432441	EPA 8270D by SIM	432861
10359688009	**MW-107**	EPA 3510C	432441	EPA 8270D by SIM	432861
10359688010	**MW-106**	EPA 3510C	432441	EPA 8270D by SIM	432861

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Pace Analytical®
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10359688

Page: 1 of 1

1824827

Section A Required Client Information:

Company: AECOM
Address: 710 Lasalle Ave. Suite 500
Minneapolis MN 55402
Email To: andrew.tarara@aecom.com
Phone: (612)-376-2000 Fax: –
Requested Due Date/TAT: std.

Section B Required Project Information:

Report To: Drew Tarara
Copy To:
Purchase Order No.:
Project Name: M+6 Semi-Annual
Project Number: 60436248

Section C Invoice Information:

Attention: Same
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #: 17489 #9

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE:

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes MATRIX / CODE

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	RCP by 8270D SIMs	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-24W					8-16-16	1706		2	2									X		001
2	MW-26W					1	1745		1	1									1		002
3	FB-2					8-19-16	0800		1	1									1		003
4	MW-12A					1	0830		1	1									1		004
5	MW-23B					1	0856		1	1									1		005
6	MW-103					1	0954		1	1									1		006
7	MW-118					1	1031		1	1									1		007
8	MW-108					1	1114		1	1									1		008
9	MW-107					1	1153		1	1									1		009
10	MW-106					1	1233		1	1									1		010
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
				[signature] Pace	8/19/16	1440	5.9 5.7 7.7	Y	N	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Ben Klaus
SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 8-19-16

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: AECOM

Project #: WO#: 10359688

10359688

Courier: ☑ Commercial ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No **Optional:** Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☐ 151401163 ☐ 151401164 ☐ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 5.9, 5.7, 7.7 **Cooler Temp Corrected (°C):** 5.9, 5.7, 7.7 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** +/- 0 **Date and Initials of Person Examining Contents:** 8-19-16 AG

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☐ Yes	☑ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: Carol Doug **Date:** 8/19/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

SCUR Exceptions: **Workorder #:**

Issue	Sample ID	Container Type/#
Arrived out of Temp & not Sampled the same day	MW-24W	AG1U / 2
"	MW-26W	"

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH Upon Receipt	Date Preservation Adjusted	Time Preservation Adjusted	Amount of Additional Preservative Added	Lot # of Preservative Added	pH After Adjustment	Initials

Appendix 2

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Laboratory Data Review Checklist

Doc Type: Data Review

Instructions: The following is the Minnesota Pollution Control Agency's (MPCA) informal checklist that may be used to review data. The information follows the general format of the National Functional Guidelines which is the primary data review tool used in the U.S. Environmental Protection Agency's Contract Laboratory Program for Superfund analytical work. This checklist should be used in conjunction with the *Laboratory Data Checklist Guidance* (p-eao-11a): http://www.pca.state.mn.us/index.php/view-document.html?gid=16113. Also see the MPCA Laboratory Quality Control (QC) and Data Policy: http://www.pca.state.mn.us/index.php/view-document.html?gid=16288.

Project Information

Project name: MacGillis and Gibbs Quarterly Sampling Laboratory: Pace

Work order number: 10359395 Report date (mm/dd/yyyy): 8/22/2016

1. Preservation

For help with this section on holding times, containers and preservatives, refer to the Minnesota Department of Health's website at: http://www.health.state.mn.us/divs/phl/environmental/handbook/internet/envhandbook.html.

Questions			Yes	No	N/A	Comments
a.	Is there a chain of custody (COC) with the report?		☒	☐	☐	
b.	Is there a sample condition form with the report?		☒	☐	☐	
c.	Were there samples requiring preservation?		☐	☒	☐	
	i.	If so, were they properly preserved?	☐	☐	☒	
	ii.	Were they received on ice?	☒	☐	☐	
d.	Were samples received in the correct containers?		☒	☐	☐	
	i.	Was there enough sample volume/weight to complete all requested analyses?	☒	☐	☐	
	ii.	Was there enough extra sample collected to complete method required batch QC?	☒	☐	☐	
e.	Were samples received with adequate holding time for sample prep for all requested analyses?		☒	☐	☐	
f.	Are there notes about sample condition or holding time issues on the COC? Explain impact.		☐	☒	☐	
g.	Is there narration or data qualifiers within the report about sample condition or holding time issues? Explain impact.		☐	☒	☐	

2. Calibration

Question		Yes	No	N/A	Comments
a.	Do the report narrative or data qualifiers indicate calibration problems for any analyses? If yes, explain the data impact.	☐	☒	☐	

3. Blanks

Question			Yes	No	N/A	Comments
a.	Do any of the analyses contain samples for field or trip blanks?		☒	☐	☐	See SDG 10359540
	i.	If yes, are there target analytes present above the reporting limit?	☐	☒	☐	
	ii.	If yes, are the same compounds also present in the samples? Explain possible impact.	☐	☐	☒	
b.	Do method blanks for any analyses contain target analytes above the reporting limit?		☐	☒	☐	
	i.	If yes, are the same compounds present in the samples?	☐	☐	☒	
	ii.	Is the amount of target analyte in the blank more than 1/10th of that in the sample(s)? Explain the possible impact on sample results.	☐	☐	☒	

4. Surrogates

Question			Yes	No	N/A	Comments
a.	Are there organic analyses that contain surrogate compounds?		☐	☒	☐	
b.	Are the lab recovery limits specified on the report?		☐	☐	☒	
	i.	Do the lab limits seem reasonable when compared with the suggested guidelines in the MPCA QC Policy?	☐	☐	☒	
c.	Are there surrogates outside lab limits? (These should have a data qualifier)		☐	☐	☒	
	i.	If yes, are the surrogates above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Explain what this could mean for the affected samples.	☐	☐	☒	

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Question			Yes	No	N/A	Comments
a.	Are there LCS/LCSD samples present for the reported analyses? (An LCS alone is acceptable if there is an Matrix Spike/Matrix Spike Duplicate [MS/MSD] or sample/sample dup for precision.)		☒	☐	☐	LCS
	i.	If so, do the lab limits seem reasonable compared to the suggested guidelines in the MPCA QC Policy?	☒	☐	☐	
b.	Are there LCS/LCSD compounds outside lab limits? (These should have a data qualifier.)		☐	☒	☐	
	i.	If yes, are the analytes above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Are all samples in the preparation batch also flagged for the same analyte(s)?	☐	☐	☒	
	iv.	Explain what this could mean for the affected samples.	☐	☐	☒	

6. Matrix Spike/Matrix Spike Duplicate/Sample Duplicate (MS/MSD/Dup)

Question				Yes	No	N/A	Comments
a.	Do the analytical methods used require an MS and/or MSD? If no, skip to 6.b.			☒	☐	☐	
	i.	Have the required matrix spikes been prepared and reported?		☒	☐	☐	
	ii.	If no, is there and explanation in the report as to why?		☐	☐	☒	
	iii.	Did the lab process an alternate spiked sample (such as LCSD) instead?		☐	☐	☒	
	iv.	Are the lab limits specified on the report?		☒	☐	☐	
	v.	Do the limits seem reasonable when compared to the suggested guidelines in the MPCA QC Policy?		☒	☐	☐	
	vi.	Are there compounds outside the lab limits?		☐	☒	☐	
		1.	If yes, are the analytes above the lab limits?	☐	☒	☐	
		2.	Below the lab limits?	☐	☒	☐	
		3.	Is the source sample also flagged for compounds outside lab limits?	☐	☐	☒	
b.	Is a sample duplicate reported for the analytical method(s)? If no, skip to 6.c.			☒	☐	☐	MS/MSD and field duplicate
	i.	Is the RPD for the duplicate pair within the lab limits?		☒	☐	☐	Field dup RPD, 28% for hexavalent chromium. Limit <20%. Results J flagged as estimated.
	ii.	If no, has the associated source sample been flagged?		☐	☐	☒	
c.	What is the impact of failed QC on this project?			☐	☐	☐	Field duplicate results show some imprecision. Both well above standard so data quality is acceptable.

7. Method Detection Limits/Report Limits

Question		Yes	No	N/A	Comments
a.	Are reporting and/or method detection limits clearly listed on the report for all analyses? (may also be called quantitation limits)	☒	☐	☐	Results reported to the MDL

Additional comments on report:

Pace is not NELAC accredited for the hexavalent chromium analysis. They are certified through MDH.

Qualifiers added:

J flag to hexavalent chromium result in samples MW-20 and Dup-1 due to field duplicate imprecision.

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Laboratory Data Review Checklist

Doc Type: Data Review

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Project Information

Project name: MacGillis and Gibbs Quarterly Sampling Laboratory: Pace

Work order number: 10359402 Report date (mm/dd/yyyy): 8/17/16

1. Preservation

For help with this section on holding times, containers and preservatives, refer to the Minnesota Department of Health's website at: http://www.health.state.mn.us/divs/phl/environmental/handbook/internet/envhandbook.html.

Questions			Yes	No	N/A	Comments
a.	Is there a chain of custody (COC) with the report?		☒	☐	☐	
b.	Is there a sample condition form with the report?		☒	☐	☐	
c.	Were there samples requiring preservation?		☐	☒	☐	
	i.	If so, were they properly preserved?	☐	☐	☒	
	ii.	Were they received on ice?	☒	☐	☐	
d.	Were samples received in the correct containers?		☒	☐	☐	
	i.	Was there enough sample volume/weight to complete all requested analyses?	☒	☐	☐	
	ii.	Was there enough extra sample collected to complete method required batch QC?	☐	☐	☒	
e.	Were samples received with adequate holding time for sample prep for all requested analyses?		☒	☐	☐	
f.	Are there notes about sample condition or holding time issues on the COC? Explain impact.		☐	☒	☐	
g.	Is there narration or data qualifiers within the report about sample condition or holding time issues? Explain impact.		☐	☒	☐	

2. Calibration

Question		Yes	No	N/A	Comments
a.	Do the report narrative or data qualifiers indicate calibration problems for any analyses? If yes, explain the data impact.	☐	☒	☐	

3. Blanks

Question			Yes	No	N/A	Comments
a.	Do any of the analyses contain samples for field or trip blanks?		☐	☒	☐	
	i.	If yes, are there target analytes present above the reporting limit?	☐	☐	☒	
	ii.	If yes, are the same compounds also present in the samples? Explain possible impact.	☐	☐	☒	
b.	Do method blanks for any analyses contain target analytes above the reporting limit?		☐	☒	☐	
	i.	If yes, are the same compounds present in the samples?	☐	☐	☒	
	ii.	Is the amount of target analyte in the blank more than 1/10th of that in the sample(s)? Explain the possible impact on sample results.	☐	☐	☒	

4. Surrogates

Question			Yes	No	N/A	Comments
a.	Are there organic analyses that contain surrogate compounds?		☒	☐	☐	Dioxins - internal standards used
b.	Are the lab recovery limits specified on the report?		☐	☒	☐	
	i.	Do the lab limits seem reasonable when compared with the suggested guidelines in the MPCA QC Policy?	☐	☐	☒	
c.	Are there surrogates outside lab limits? (These should have a data qualifier)		☐	☐	☒	Recoveries ranged from 47 - 94%, reasonable.
	i.	If yes, are the surrogates above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Explain what this could mean for the affected samples.	☐	☐	☒	

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Question			Yes	No	N/A	Comments
a.	Are there LCS/LCSD samples present for the reported analyses? (An LCS alone is acceptable if there is an Matrix Spike/Matrix Spike Duplicate [MS/MSD] or sample/sample dup for precision.)		☒	☐	☐	LCS/LCSD
	i.	If so, do the lab limits seem reasonable compared to the suggested guidelines in the MPCA QC Policy?	☒	☐	☐	
b.	Are there LCS/LCSD compounds outside lab limits? (These should have a data qualifier.)		☐	☒	☐	
	i.	If yes, are the analytes above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Are all samples in the preparation batch also flagged for the same analyte(s)?	☐	☐	☒	
	iv.	Explain what this could mean for the affected samples.	☐	☐	☒	

6. Matrix Spike/Matrix Spike Duplicate/Sample Duplicate (MS/MSD/Dup)

Question				Yes	No	N/A	Comments
a.	Do the analytical methods used require an MS and/or MSD? If no, skip to 6.b.			☐	☒	☐	
	i.	Have the required matrix spikes been prepared and reported?		☐	☐	☒	
	ii.	If no, is there and explanation in the report as to why?		☐	☐	☒	
	iii.	Did the lab process an alternate spiked sample (such as LCSD) instead?		☐	☐	☒	
	iv.	Are the lab limits specified on the report?		☐	☐	☒	
	v.	Do the limits seem reasonable when compared to the suggested guidelines in the MPCA QC Policy?		☐	☐	☒	
	vi.	Are there compounds outside the lab limits?		☐	☐	☒	
		1.	If yes, are the analytes above the lab limits?	☐	☐	☒	
		2.	Below the lab limits?	☐	☐	☒	
		3.	Is the source sample also flagged for compounds outside lab limits?	☐	☐	☐	
b.	Is a sample duplicate reported for the analytical method(s)? If no, skip to 6.c.			☒	☐	☐	LCS/LCSD
	i.	Is the RPD for the duplicate pair within the lab limits?		☒	☐	☐	
	ii.	If no, has the associated source sample been flagged?		☐	☐	☒	
c.	What is the impact of failed QC on this project?			☐	☐	☒	

7. Method Detection Limits/Report Limits

Question		Yes	No	N/A	Comments
a.	Are reporting and/or method detection limits clearly listed on the report for all analyses? (may also be called quantitation limits)	☒	☐	☐	Results below the calibration range were flagged J and are considered estimated

Additional comments on report:

No qualifiers were assigned based on this review. Laboratory J flags were retained. The laboratory flag "I" to indicate incorrect isotope ratios were obtained were changed to a J flag.

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Laboratory Data Review Checklist

Doc Type: Data Review

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Project Information

Project name: MacGillis and Gibbs Quarterly Sampling Laboratory: Pace

Work order number: 10359403 Report date (mm/dd/yyyy): 8/25/2016

1. Preservation

For help with this section on holding times, containers and preservatives, refer to the Minnesota Department of Health's website at: http://www.health.state.mn.us/divs/phl/environmental/handbook/internet/envhandbook.html.

Questions		Yes	No	N/A	Comments
a.	Is there a chain of custody (COC) with the report?	☒	☐	☐	Results for dioxins reported in a separate report.
b.	Is there a sample condition form with the report?	☒	☐	☐	
c.	Were there samples requiring preservation?	☒	☐	☐	
i.	If so, were they properly preserved?	☒	☐	☐	
ii.	Were they received on ice?	☒	☐	☐	
d.	Were samples received in the correct containers?	☒	☐	☐	
i.	Was there enough sample volume/weight to complete all requested analyses?	☒	☐	☐	
ii.	Was there enough extra sample collected to complete method required batch QC?	☒	☐	☐	
e.	Were samples received with adequate holding time for sample prep for all requested analyses?	☒	☐	☐	
f.	Are there notes about sample condition or holding time issues on the COC? Explain impact.	☐	☒	☐	
g.	Is there narration or data qualifiers within the report about sample condition or holding time issues? Explain impact.	☐	☒	☐	

2. Calibration

Question		Yes	No	N/A	Comments
a.	Do the report narrative or data qualifiers indicate calibration problems for any analyses? If yes, explain the data impact.	☐	☒	☐	

3. Blanks

Question			Yes	No	N/A	Comments
a.	Do any of the analyses contain samples for field or trip blanks?		☒	☐	☐	See SDG 10359548. PCP 1.3 ug/L. Arsenic ND
	i.	If yes, are there target analytes present above the reporting limit?	☒	☐	☐	
	ii.	If yes, are the same compounds also present in the samples? Explain possible impact.	☒	☐	☐	Potential for false positives in four samples with concentrations <10x blank concentration
b.	Do method blanks for any analyses contain target analytes above the reporting limit?		☐	☒	☐	
	i.	If yes, are the same compounds present in the samples?	☐	☐	☒	
	ii.	Is the amount of target analyte in the blank more than 1/10th of that in the sample(s)? Explain the possible impact on sample results.	☐	☐	☒	

4. Surrogates

Question			Yes	No	N/A	Comments
a.	Are there organic analyses that contain surrogate compounds?		☒	☐	☐	
b.	Are the lab recovery limits specified on the report?		☒	☐	☐	
	i.	Do the lab limits seem reasonable when compared with the suggested guidelines in the MPCA QC Policy?	☒	☐	☐	
c.	Are there surrogates outside lab limits? (These should have a data qualifier)		☒	☐	☐	
	i.	If yes, are the surrogates above the lab limits?	☐	☒	☐	
	ii.	Below the lab limits?	☒	☐	☐	
	iii.	Explain what this could mean for the affected samples.	☐	☐	☐	Surrogates were diluted out, no affect.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Question			Yes	No	N/A	Comments
a.	Are there LCS/LCSD samples present for the reported analyses? (An LCS alone is acceptable if there is an Matrix Spike/Matrix Spike Duplicate [MS/MSD] or sample/sample dup for precision.)		☒	☐	☐	LCS
	i.	If so, do the lab limits seem reasonable compared to the suggested guidelines in the MPCA QC Policy?	☐	☒	☐	PCP is 30 - 125, less than MPCA guidance of 50-150%. Arsenic, ok.
b.	Are there LCS/LCSD compounds outside lab limits? (These should have a data qualifier.)		☐	☒	☐	
	i.	If yes, are the analytes above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Are all samples in the preparation batch also flagged for the same analyte(s)?	☐	☐	☒	
	iv.	Explain what this could mean for the affected samples.	☐	☐	☒	

6. Matrix Spike/Matrix Spike Duplicate/Sample Duplicate (MS/MSD/Dup)

Question				Yes	No	N/A	Comments
a.	Do the analytical methods used require an MS and/or MSD? If no, skip to 6.b.			☒	☐	☐	
	i.	Have the required matrix spikes been prepared and reported?		☒	☐	☐	
	ii.	If no, is there and explanation in the report as to why?		☐	☐	☒	
	iii.	Did the lab process an alternate spiked sample (such as LCSD) instead?		☐	☐	☒	
	iv.	Are the lab limits specified on the report?		☒	☐	☐	
	v.	Do the limits seem reasonable when compared to the suggested guidelines in the MPCA QC Policy?		☐	☒	☐	PCP is 30 - 125, less than MPCA guidance of 50-150%. Arsenic, ok.
	vi.	Are there compounds outside the lab limits?		☐	☒	☐	
		1.	If yes, are the analytes above the lab limits?	☐	☒	☐	
		2.	Below the lab limits?	☐	☒	☐	
		3.	Is the source sample also flagged for compounds outside lab limits?	☐	☐	☒	
b.	Is a sample duplicate reported for the analytical method(s)? If no, skip to 6.c.			☒	☐	☐	MS/MSD and field duplicate
	i.	Is the RPD for the duplicate pair within the lab limits?		☐	☒	☐	MS/MSD RPD for PCP was 37%. Spiked sample ND, no qualifiers; Field dup ok.
	ii.	If no, has the associated source sample been flagged?		☐	☐	☒	
c.	What is the impact of failed QC on this project?			☐	☐	☐	None

7. Method Detection Limits/Report Limits

Question		Yes	No	N/A	Comments
a.	Are reporting and/or method detection limits clearly listed on the report for all analyses? (may also be called quantitation limits)	☒	☐	☐	Results reported to the MDL

Additional comments on report:

Qualifiers added:

Flags to pentachlorophenol results due to equipment blank detection of 1.3 ug/L for samples:

MW-21W 3.5 J

MW-21B 7.5 J

EW-7 0.56; changed to <0.62 J; MDL changed from 0.29 to 0.62 ug/L

MW-9 0.33; changed to <0.63 J; MDL changed from 0.30 to 0.63 ug/L

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Laboratory Data Review Checklist

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Project Information

Project name: MacGillis and Gibbs Quarterly Sampling Laboratory: Pace

Work order number: 10359540 Report date (mm/dd/yyyy): 8/22/2016

1. Preservation

For help with this section on holding times, containers and preservatives, refer to the Minnesota Department of Health's website at: http://www.health.state.mn.us/divs/phl/environmental/handbook/internet/envhandbook.html.

Questions			Yes	No	N/A	Comments
a.	Is there a chain of custody (COC) with the report?		☒	☐	☐	
b.	Is there a sample condition form with the report?		☒	☐	☐	
c.	Were there samples requiring preservation?		☐	☒	☐	
	i.	If so, were they properly preserved?	☐	☐	☒	
	ii.	Were they received on ice?	☒	☐	☐	
d.	Were samples received in the correct containers?		☒	☐	☐	
	i.	Was there enough sample volume/weight to complete all requested analyses?	☒	☐	☐	
	ii.	Was there enough extra sample collected to complete method required batch QC?	☒	☐	☐	
e.	Were samples received with adequate holding time for sample prep for all requested analyses?		☒	☐	☐	
f.	Are there notes about sample condition or holding time issues on the COC? Explain impact.		☐	☒	☐	
g.	Is there narration or data qualifiers within the report about sample condition or holding time issues? Explain impact.		☐	☒	☐	

2. Calibration

Question		Yes	No	N/A	Comments
a.	Do the report narrative or data qualifiers indicate calibration problems for any analyses? If yes, explain the data impact.	☐	☒	☐	

3. Blanks

Question			Yes	No	N/A	Comments
a.	Do any of the analyses contain samples for field or trip blanks?		☒	☐	☐	
	i.	If yes, are there target analytes present above the reporting limit?	☐	☒	☐	
	ii.	If yes, are the same compounds also present in the samples? Explain possible impact.	☐	☐	☒	
b.	Do method blanks for any analyses contain target analytes above the reporting limit?		☐	☒	☐	
	i.	If yes, are the same compounds present in the samples?	☐	☐	☒	
	ii.	Is the amount of target analyte in the blank more than 1/10th of that in the sample(s)? Explain the possible impact on sample results.	☐	☐	☒	

4. Surrogates

Question			Yes	No	N/A	Comments
a.	Are there organic analyses that contain surrogate compounds?		☐	☒	☐	
b.	Are the lab recovery limits specified on the report?		☐	☐	☒	
	i.	Do the lab limits seem reasonable when compared with the suggested guidelines in the MPCA QC Policy?	☐	☐	☒	
c.	Are there surrogates outside lab limits? (These should have a data qualifier)		☐	☐	☒	
	i.	If yes, are the surrogates above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Explain what this could mean for the affected samples.	☐	☐	☒	

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Question			Yes	No	N/A	Comments
a.	Are there LCS/LCSD samples present for the reported analyses? (An LCS alone is acceptable if there is an Matrix Spike/Matrix Spike Duplicate [MS/MSD] or sample/sample dup for precision.)		☒	☐	☐	LCS
	i.	If so, do the lab limits seem reasonable compared to the suggested guidelines in the MPCA QC Policy?	☒	☐	☐	
b.	Are there LCS/LCSD compounds outside lab limits? (These should have a data qualifier.)		☐	☒	☐	
	i.	If yes, are the analytes above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Are all samples in the preparation batch also flagged for the same analyte(s)?	☐	☐	☒	
	iv.	Explain what this could mean for the affected samples.	☐	☐	☒	

6. Matrix Spike/Matrix Spike Duplicate/Sample Duplicate (MS/MSD/Dup)

Question				Yes	No	N/A	Comments
a.	Do the analytical methods used require an MS and/or MSD? If no, skip to 6.b.			☒	☐	☐	
	i.	Have the required matrix spikes been prepared and reported?		☒	☐	☐	
	ii.	If no, is there and explanation in the report as to why?		☐	☐	☒	
	iii.	Did the lab process an alternate spiked sample (such as LCSD) instead?		☐	☐	☒	
	iv.	Are the lab limits specified on the report?		☒	☐	☐	
	v.	Do the limits seem reasonable when compared to the suggested guidelines in the MPCA QC Policy?		☒	☐	☐	
	vi.	Are there compounds outside the lab limits?		☐	☒	☐	
		1.	If yes, are the analytes above the lab limits?	☐	☒	☐	
		2.	Below the lab limits?	☐	☒	☐	
		3.	Is the source sample also flagged for compounds outside lab limits?	☐	☐	☒	
b.	Is a sample duplicate reported for the analytical method(s)? If no, skip to 6.c.			☒	☐	☐	MS/MSD and field duplicate
	i.	Is the RPD for the duplicate pair within the lab limits?		☒	☐	☐	Both MS/MSD and field duplicate RPDs in control
	ii.	If no, has the associated source sample been flagged?		☐	☐	☒	
c.	What is the impact of failed QC on this project?			☐	☐	☒	

7. Method Detection Limits/Report Limits

Question		Yes	No	N/A	Comments
a.	Are reporting and/or method detection limits clearly listed on the report for all analyses? (may also be called quantitation limits)	☒	☐	☐	Results reported to the MDL

Additional comments on report:

Pace is not NELAC accredited for the hexavalent chromium analysis. They are certified through MDH.

Qualifiers added:

None

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Laboratory Data Review Checklist

Doc Type: Data Review

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Project Information

Project name: MacGillis and Gibbs Quarterly Sampling Laboratory: Pace

Work order number: 10359545 Report date (mm/dd/yyyy): 8/18/16

1. Preservation

For help with this section on holding times, containers and preservatives, refer to the Minnesota Department of Health's website at: http://www.health.state.mn.us/divs/phl/environmental/handbook/internet/envhandbook.html.

Questions			Yes	No	N/A	Comments
a.	Is there a chain of custody (COC) with the report?		☒	☐	☐	
b.	Is there a sample condition form with the report?		☒	☐	☐	
c.	Were there samples requiring preservation?		☐	☒	☐	
	i.	If so, were they properly preserved?	☐	☐	☒	
	ii.	Were they received on ice?	☒	☐	☐	
d.	Were samples received in the correct containers?		☒	☐	☐	
	i.	Was there enough sample volume/weight to complete all requested analyses?	☒	☐	☐	
	ii.	Was there enough extra sample collected to complete method required batch QC?	☐	☐	☒	
e.	Were samples received with adequate holding time for sample prep for all requested analyses?		☒	☐	☐	
f.	Are there notes about sample condition or holding time issues on the COC? Explain impact.		☐	☒	☐	
g.	Is there narration or data qualifiers within the report about sample condition or holding time issues? Explain impact.		☐	☒	☐	

2. Calibration

Question		Yes	No	N/A	Comments
a.	Do the report narrative or data qualifiers indicate calibration problems for any analyses? If yes, explain the data impact.	☐	☒	☐	

3. Blanks

Question			Yes	No	N/A	Comments
a.	Do any of the analyses contain samples for field or trip blanks?		☐	☒	☐	
	i.	If yes, are there target analytes present above the reporting limit?	☐	☐	☒	
	ii.	If yes, are the same compounds also present in the samples? Explain possible impact.	☐	☐	☒	
b.	Do method blanks for any analyses contain target analytes above the reporting limit?		☐	☒	☐	
	i.	If yes, are the same compounds present in the samples?	☐	☐	☒	
	ii.	Is the amount of target analyte in the blank more than 1/10th of that in the sample(s)? Explain the possible impact on sample results.	☐	☐	☒	

4. Surrogates

Question			Yes	No	N/A	Comments
a.	Are there organic analyses that contain surrogate compounds?		☒	☐	☐	Dioxins - internal standards used
b.	Are the lab recovery limits specified on the report?		☐	☒	☐	
	i.	Do the lab limits seem reasonable when compared with the suggested guidelines in the MPCA QC Policy?	☐	☐	☒	
c.	Are there surrogates outside lab limits? (These should have a data qualifier)		☐	☐	☒	Recoveries ranged from 54 - 105%, reasonable.
	i.	If yes, are the surrogates above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Explain what this could mean for the affected samples.	☐	☐	☒	

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Question			Yes	No	N/A	Comments
a.	Are there LCS/LCSD samples present for the reported analyses? (An LCS alone is acceptable if there is an Matrix Spike/Matrix Spike Duplicate [MS/MSD] or sample/sample dup for precision.)		☒	☐	☐	LCS/LCSD
	i.	If so, do the lab limits seem reasonable compared to the suggested guidelines in the MPCA QC Policy?	☒	☐	☐	
b.	Are there LCS/LCSD compounds outside lab limits? (These should have a data qualifier.)		☐	☒	☐	
	i.	If yes, are the analytes above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Are all samples in the preparation batch also flagged for the same analyte(s)?	☐	☐	☒	
	iv.	Explain what this could mean for the affected samples.	☐	☐	☒	

6. Matrix Spike/Matrix Spike Duplicate/Sample Duplicate (MS/MSD/Dup)

Question				Yes	No	N/A	Comments
a.	Do the analytical methods used require an MS and/or MSD? If no, skip to 6.b.			☐	☒	☐	
	i.	Have the required matrix spikes been prepared and reported?		☐	☐	☒	
	ii.	If no, is there and explanation in the report as to why?		☐	☐	☒	
	iii.	Did the lab process an alternate spiked sample (such as LCSD) instead?		☐	☐	☒	
	iv.	Are the lab limits specified on the report?		☐	☐	☒	
	v.	Do the limits seem reasonable when compared to the suggested guidelines in the MPCA QC Policy?		☐	☐	☒	
	vi.	Are there compounds outside the lab limits?		☐	☐	☒	
		1.	If yes, are the analytes above the lab limits?	☐	☐	☒	
		2.	Below the lab limits?	☐	☐	☒	
		3.	Is the source sample also flagged for compounds outside lab limits?	☐	☐	☐	
b.	Is a sample duplicate reported for the analytical method(s)? If no, skip to 6.c.			☒	☐	☐	LCS/LCSD
	i.	Is the RPD for the duplicate pair within the lab limits?		☒	☐	☐	
	ii.	If no, has the associated source sample been flagged?		☐	☐	☒	
c.	What is the impact of failed QC on this project?			☐	☐	☒	

7. Method Detection Limits/Report Limits

Question		Yes	No	N/A	Comments
a.	Are reporting and/or method detection limits clearly listed on the report for all analyses? (may also be called quantitation limits)	☒	☐	☐	Results below the calibration range were flagged J and are considered estimated

Additional comments on report:

No qualifiers were assigned based on this review. Laboratory J flags were retained. The laboratory flag "I" to indicate incorrect isotope ratios were obtained were changed to a J flag. The laboratory "P" flag to indicate polychlorinated diphenyl ethers were present were also changed to a J flag.

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Laboratory Data Review Checklist

Doc Type: Data Review

Instructions: The following is the Minnesota Pollution Control Agency's (MPCA) informal checklist that may be used to review data. The information follows the general format of the National Functional Guidelines which is the primary data review tool used in the U.S. Environmental Protection Agency's Contract Laboratory Program for Superfund analytical work. This checklist should be used in conjunction with the *Laboratory Data Checklist Guidance* (p-eao-11a): http://www.pca.state.mn.us/index.php/view-document.html?gid=16113. Also see the MPCA Laboratory Quality Control (QC) and Data Policy: http://www.pca.state.mn.us/index.php/view-document.html?gid=16288.

Project Information

Project name: MacGillis and Gibbs Quarterly Sampling Laboratory: Pace

Work order number: 10359548 Report date (mm/dd/yyyy): 8/30/2016

1. Preservation

For help with this section on holding times, containers and preservatives, refer to the Minnesota Department of Health's website at: http://www.health.state.mn.us/divs/phl/environmental/handbook/internet/envhandbook.html.

Questions			Yes	No	N/A	Comments
a.	Is there a chain of custody (COC) with the report?		☒	☐	☐	Results for dioxins reported in a separate report.
b.	Is there a sample condition form with the report?		☒	☐	☐	
c.	Were there samples requiring preservation?		☒	☐	☐	
	i.	If so, were they properly preserved?	☒	☐	☐	
	ii.	Were they received on ice?	☒	☐	☐	
d.	Were samples received in the correct containers?		☒	☐	☐	
	i.	Was there enough sample volume/weight to complete all requested analyses?	☒	☐	☐	
	ii.	Was there enough extra sample collected to complete method required batch QC?	☒	☐	☐	
e.	Were samples received with adequate holding time for sample prep for all requested analyses?		☒	☐	☐	
f.	Are there notes about sample condition or holding time issues on the COC? Explain impact.		☐	☒	☐	
g.	Is there narration or data qualifiers within the report about sample condition or holding time issues? Explain impact.		☐	☒	☐	

2. Calibration

Question		Yes	No	N/A	Comments
a.	Do the report narrative or data qualifiers indicate calibration problems for any analyses? If yes, explain the data impact.	☐	☒	☐	

3. Blanks

Question			Yes	No	N/A	Comments
a.	Do any of the analyses contain samples for field or trip blanks?		☒	☐	☐	PCP 1.3 ug/L. Arsenic ND
	i.	If yes, are there target analytes present above the reporting limit?	☒	☐	☐	
	ii.	If yes, are the same compounds also present in the samples? Explain possible impact.	☒	☐	☐	Potential for false positives in four samples with concentrations <10x blank concentration
b.	Do method blanks for any analyses contain target analytes above the reporting limit?		☐	☒	☐	
	i.	If yes, are the same compounds present in the samples?	☐	☐	☒	
	ii.	Is the amount of target analyte in the blank more than 1/10th of that in the sample(s)? Explain the possible impact on sample results.	☐	☐	☒	

4. Surrogates

Question			Yes	No	N/A	Comments
a.	Are there organic analyses that contain surrogate compounds?		☒	☐	☐	
b.	Are the lab recovery limits specified on the report?		☒	☐	☐	
	i.	Do the lab limits seem reasonable when compared with the suggested guidelines in the MPCA QC Policy?	☒	☐	☐	
c.	Are there surrogates outside lab limits? (These should have a data qualifier)		☒	☐	☐	
	i.	If yes, are the surrogates above the lab limits?	☐	☒	☐	
	ii.	Below the lab limits?	☒	☐	☐	
	iii.	Explain what this could mean for the affected samples.	☐	☐	☐	Surrogates were diluted out, no affect.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Question			Yes	No	N/A	Comments
a.	Are there LCS/LCSD samples present for the reported analyses? (An LCS alone is acceptable if there is an Matrix Spike/Matrix Spike Duplicate [MS/MSD] or sample/sample dup for precision.)		☒	☐	☐	LCS
	i.	If so, do the lab limits seem reasonable compared to the suggested guidelines in the MPCA QC Policy?	☐	☒	☐	PCP is 30 - 125, less than MPCA guidance of 50-150%. Arsenic, ok.
b.	Are there LCS/LCSD compounds outside lab limits? (These should have a data qualifier.)		☐	☒	☐	
	i.	If yes, are the analytes above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Are all samples in the preparation batch also flagged for the same analyte(s)?	☐	☐	☒	
	iv.	Explain what this could mean for the affected samples.	☐	☐	☒	

6. Matrix Spike/Matrix Spike Duplicate/Sample Duplicate (MS/MSD/Dup)

Question				Yes	No	N/A	Comments
a.	Do the analytical methods used require an MS and/or MSD? If no, skip to 6.b.			☒	☐	☐	
	i.	Have the required matrix spikes been prepared and reported?		☒	☐	☐	
	ii.	If no, is there and explanation in the report as to why?		☐	☐	☒	
	iii.	Did the lab process an alternate spiked sample (such as LCSD) instead?		☐	☐	☒	
	iv.	Are the lab limits specified on the report?		☒	☐	☐	
	v.	Do the limits seem reasonable when compared to the suggested guidelines in the MPCA QC Policy?		☐	☒	☐	PCP is 30 - 125, less than MPCA guidance of 50-150%. Arsenic, ok.
	vi.	Are there compounds outside the lab limits?		☐	☒	☐	
		1.	If yes, are the analytes above the lab limits?	☐	☒	☐	
		2.	Below the lab limits?	☐	☒	☐	
		3.	Is the source sample also flagged for compounds outside lab limits?	☐	☐	☒	
b.	Is a sample duplicate reported for the analytical method(s)? If no, skip to 6.c.			☒	☐	☐	MS/MSD and three field duplicates
	i.	Is the RPD for the duplicate pair within the lab limits?		☐	☒	☐	RPDs ok except one field duplicate pair for PCP had an RPD of 44.5%. Sample and duplicate qualified as estimated.
	ii.	If no, has the associated source sample been flagged?		☐	☐	☒	
c.	What is the impact of failed QC on this project?			☐	☐	☐	None

7. Method Detection Limits/Report Limits

Question		Yes	No	N/A	Comments
a.	Are reporting and/or method detection limits clearly listed on the report for all analyses? (may also be called quantitation limits)	☒	☐	☐	Results reported to the MDL

Additional comments on report:

Qualifiers added:

J flag to pentachlorophenol results for samples MW-105 and Dup3 due to field duplicate imprecision.

Flags to pentachlorophenol results for samples MW-105, MW-104, EW-12, and EW-4 due to an equipment blank detection of 1.3 ug/L:

MW-105 11.7 J

MW-104 1.3 ug/L changed to <1.3 ug/L J; MDL and RP changed to 1.3

EW-12 5.8 J

EW-4 3.2 J

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St. Paul, MN 55155-4194

Laboratory Data Review Checklist

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Project Information

Project name: MacGillis and Gibbs Quarterly Sampling Laboratory: Pace

Work order number: 10359688 Report date (mm/dd/yyyy): 8/31/2016

1. Preservation

For help with this section on holding times, containers and preservatives, refer to the Minnesota Department of Health's website at: http://www.health.state.mn.us/divs/phl/environmental/handbook/internet/envhandbook.html.

Questions			Yes	No	N/A	Comments
a.	Is there a chain of custody (COC) with the report?		☒	☐	☐	
b.	Is there a sample condition form with the report?		☒	☐	☐	
c.	Were there samples requiring preservation?		☐	☒	☐	
	i.	If so, were they properly preserved?	☐	☐	☒	
	ii.	Were they received on ice?	☒	☐	☐	
d.	Were samples received in the correct containers?		☒	☐	☐	
	i.	Was there enough sample volume/weight to complete all requested analyses?	☒	☐	☒	
	ii.	Was there enough extra sample collected to complete method required batch QC?	☐	☒	☒	MS/MSDs in alternate SDG. ok
e.	Were samples received with adequate holding time for sample prep for all requested analyses?		☒	☐	☐	
f.	Are there notes about sample condition or holding time issues on the COC? Explain impact.		☒	☐	☐	Samples MW-24W and MW-26W arrived at 7.7 degrees C and were not sampled on the same day. Results qualified as estimated (J).
g.	Is there narration or data qualifiers within the report about sample condition or holding time issues? Explain impact.		☒	☐	☐	Potential low bias due to elevated cooler temperature.

2. Calibration

Question		Yes	No	N/A	Comments
a.	Do the report narrative or data qualifiers indicate calibration problems for any analyses? If yes, explain the data impact.	☐	☒	☐	

3. Blanks

Question			Yes	No	N/A	Comments
a.	Do any of the analyses contain samples for field or trip blanks?		☒	☐	☐	Field blank for PCP not detected
	i.	If yes, are there target analytes present above the reporting limit?	☐	☐	☒	
	ii.	If yes, are the same compounds also present in the samples? Explain possible impact.	☐	☐	☒	
b.	Do method blanks for any analyses contain target analytes above the reporting limit?		☐	☒	☐	
	i.	If yes, are the same compounds present in the samples?	☐	☐	☒	
	ii.	Is the amount of target analyte in the blank more than 1/10th of that in the sample(s)? Explain the possible impact on sample results.	☐	☐	☒	

4. Surrogates

Question			Yes	No	N/A	Comments
a.	Are there organic analyses that contain surrogate compounds?		☒	☐	☐	
b.	Are the lab recovery limits specified on the report?		☒	☐	☐	
	i.	Do the lab limits seem reasonable when compared with the suggested guidelines in the MPCA QC Policy?	☒	☐	☐	
c.	Are there surrogates outside lab limits? (These should have a data qualifier)		☒	☐	☐	
	i.	If yes, are the surrogates above the lab limits?	☐	☒	☐	
	ii.	Below the lab limits?	☒	☐	☐	Sample MW-103 had a surrogate recovery of 34% with limits of 46-125. J qualified as estimated.
	iii.	Explain what this could mean for the affected samples.	☐	☐	☐	Surrogates were diluted out, no affect.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Question			Yes	No	N/A	Comments
a.	Are there LCS/LCSD samples present for the reported analyses? (An LCS alone is acceptable if there is an Matrix Spike/Matrix Spike Duplicate [MS/MSD] or sample/sample dup for precision.)		☒	☐	☐	LCS/LCSD
	i.	If so, do the lab limits seem reasonable compared to the suggested guidelines in the MPCA QC Policy?	☐	☒	☐	PCP is 30 - 125, less than MPCA guidance of 50-150%. Arsenic, ok.
b.	Are there LCS/LCSD compounds outside lab limits? (These should have a data qualifier.)		☐	☒	☐	
	i.	If yes, are the analytes above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Are all samples in the preparation batch also flagged for the same analyte(s)?	☐	☐	☒	

	iv.	Explain what this could mean for the affected samples.	☐	☐	☒	

6. Matrix Spike/Matrix Spike Duplicate/Sample Duplicate (MS/MSD/Dup)

Question			Yes	No	N/A	Comments
a.	Do the analytical methods used require an MS and/or MSD? If no, skip to 6.b.		☒	☐	☐	
	i.	Have the required matrix spikes been prepared and reported?	☒	☐	☐	Not with this batch but provided in other SDGs and indicated no matrix affect.
	ii.	If no, is there and explanation in the report as to why?	☒	☐	☐	No sample volume.
	iii.	Did the lab process an alternate spiked sample (such as LCSD) instead?	☒	☐	☐	
	iv.	Are the lab limits specified on the report?	☒	☐	☐	
	v.	Do the limits seem reasonable when compared to the suggested guidelines in the MPCA QC Policy?	☐	☒	☐	PCP is 30 - 125, less than MPCA guidance of 50-150%.
	vi.	Are there compounds outside the lab limits?	☐	☐	☒	
		1. If yes, are the analytes above the lab limits?	☐	☐	☒	
		2. Below the lab limits?	☐	☐	☒	
		3. Is the source sample also flagged for compounds outside lab limits?	☐	☐	☒	
b.	Is a sample duplicate reported for the analytical method(s)? If no, skip to 6.c.		☒	☐	☐	LCS/LCSD
	i.	Is the RPD for the duplicate pair within the lab limits?	☒	☐	☐	
	ii.	If no, has the associated source sample been flagged?	☐	☐	☒	
c.	What is the impact of failed QC on this project?		☐	☐	☒	None

7. Method Detection Limits/Report Limits

Question		Yes	No	N/A	Comments
a.	Are reporting and/or method detection limits clearly listed on the report for all analyses? (may also be called quantitation limits)	☒	☐	☐	Results reported to the MDL

Additional comments on report:

Qualifiers added:

J flag to pentachlorophenol results for samples MW-24W and MW-26W because they arrived at 7.7 degrees C, above the 6 degree C temperature requirement.

J flag to pentachlorophenol for sample MW-103 due to low surrogate recovery.

Cibulskis, Karen

From: Wallerstedt, Jamie (MPCA) <jamie.wallerstedt@state.mn.us>
Sent: Wednesday, May 03, 2017 9:46 AM
To: Cibulskis, Karen
Subject: MacGillis and Gibbs - Quarterly GW report summaries
Attachments: Final Quarterly Sampling Report FY 2017 First Quarter.pdf; Final Quarterly Sampling Report FY 2017 Second Quarter.pdf

HI Karen,
Attached are the quarterly groundwater monitoring reports from AECOM. They owe us one more and I will forward that along to you once I receive it. These are not something that needs a review, but a submittal to provide us the data. The data analysis reports (i.e. the capture analysis and contingency plan) will be following early next week to you for review.

Thanks!

Jamie Wallerstedt, PE
Project Manager/Engineer
MPCA/Remediation Division
520 Lafayette Road North
St. Paul, MN 55155

Direct: 651.757.2094
Email: jamie.wallerstedt@state.mn.us